

BUSINESS IN THE CONTEXT OF LAUDATO SI'**1) "LAUDATO SI' & CHRISTIAN BUSINESS"****13 November 2016****Organised by FABC Climate Change Desk in collaboration with the Christian Business Forum for Climate Change****2) "BUSINESS SECTOR'S RESPONSE TO LAUDATO SI'"****6-7 November 2017****Organised by FABC Office of Human Development - Climate Change Desk with FABC Central Secretariat and the Catholic Commission for Justice and Peace of the Catholic Bishops' Conference of Thailand****Edited by****FABC Office of Human Development - Climate Change Desk
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I. **BACKGROUND**

The United Nations Framework Convention on Climate Change (UNFCCC) has been working to make nations accountable and take responsibility to reduce their carbon emissions. However, actions to date have fallen short, while global temperatures climb and the greenhouse gas (GHG) emissions that cause climate change continue to increase. “Southeast Asia is expected to face the worst effects of climate change in the next 30 to 50 years. This will have a significant impact on regional economies and livelihoods.”¹ The region is also highly dependent on natural resources and forestry, and these exports are likely to be adversely affected by extreme weather events. It is expected that millions of vulnerable people are likely to lose their homes due to flooding and famine.

If the region fails to engage in sustainable development practices and disaster risk management, regional growth and poverty eradication will be severely impacted. While many Southeast Asian countries have taken steps to tackle the impact of climate change, more needs to be done to protect livelihoods and economies. The region needs to employ a number of adaptation measures, encouraging low-carbon growth, raising public awareness, funding additional climate change research, and enhancing policy planning. In the long-term, this might help to mitigate the effects of climate change.

¹ Southgate, Laura. “The economic impact of climate change in Southeast Asia.” [globalriskinsights.com. https://globalriskinsights.com/2015/11/the-economic-impact-of-climate-change-in-southeast-asia/](https://globalriskinsights.com/2015/11/the-economic-impact-of-climate-change-in-southeast-asia/) (accessed July 1, 2017).

Pope Francis' environmental encyclical, *Laudato Si'*, in particular includes large sections devoted to the roles of business and technology. "If in a given region the state does not carry out its responsibilities, some business groups can come forward in the guise of benefactors, wield real power, and consider themselves exempt from certain rules, to the point of tolerating different forms of organised crime, human trafficking, the drug trade and violence, all of which become very difficult to eradicate."² "In recent decades, environmental issues have given rise to considerable public debate and have elicited a variety of committed and generous civic responses. Politics and business have been slow to react in a way commensurate with the urgency of the challenges facing our world."³

It is a fundamental task of the Church in Asia to call for radical conversion away from over-consumption to a more sustainable lifestyle, to a renewed sense of stewardship and a culture of respect for creation, of simplicity and sobriety, of hope and joy.⁴ A key response of the Asian Church to the climate challenge is that the Federation of Asian Bishops' Conferences (FABC) is one of the signatories to the Continental Bishops' Statement on Climate Change presented to the 20th Conference of Parties, COP20, of the UNFCCC in Lima on 5 December 2014 to join the effort of world leaders gathered for the signing of a legally binding climate agreement in Paris in 2015.

The Climate Change Desk (CCD) of the FABC's Office of Human Development (OHD) has been intensely focusing on climate change ever since its establishment in 2015. Hence, carrying forward its commitment and responding to the signs of the times, CCD-OHD was instrumental in organising two conferences for business persons which aimed to provide delegates with space for reflection on

² Yeap, Nicholas, and Charles Riley. "Pope Francis delivers tough message to Big Business." money.cnn.com. <https://money.cnn.com/2015/06/18/news/economy/pope-francis-climate-change/index.html> (accessed July 1, 2017).

³ Crux Staff. "Laudato Si' – Chapter Five: Lines of Approach and Action." cruxnow.com. <https://cruxnow.com/church/2015/06/18/laudato-si-chapter-five-lines-of-approach-and-action/> (accessed July 1, 2017)

⁴ FABC Papers: No. 136, Global Warming and Climate Change and its Impact on Asia, Challenges and the response of the Church, CLIMATE CHANGE SEMINAR , 19 - 20 October 2011, held at Assumption University, Bangkok, Thailand

Laudato Si' and to understand the best possible way of expanding sustainability commitments in the context of extreme regional climatic changes. The first conference, "*Laudato Si'* & Christian Business" took place in Mumbai, India on 13 November 2016 and brought together 95 business persons from the state of Maharashtra. The second conference in Bangkok, "Business Sector's Response to *Laudato Si'*", held between 6-7 November 2017, had 30 participants – both business persons and civil society members – from Hong Kong, India, Indonesia, Malaysia, Philippines, Thailand and Vietnam. Both conferences comprised an introductory session on climate change, followed by insights from *Laudato Si'* for reflection, technical sessions which sought to empower participants with information to be efficient caretakers of Our Common Home, sharing of good business practices to provide an opportunity for mutual learning and enhance participants' skills to be eco-efficient business practitioners, and a concluding session to explore the way forward and provide for future collaboration.

II. INAUGURAL ADDRESSES

A. *Summary of the Welcome Address by Mr. Albert D'Souza at the 2016 Conference*

A couple of months ago, when Fr. Allwyn D'Silva requested me to convene a meeting of the Christian businessmen, I thought it could be a seminar for a charitable cause where normally business persons are called upon. However, I realised that the cause was something totally different - it was on environment, nature, saving Mother Earth and related issues. And I was convinced that the objective of the seminar was of much higher importance than that of any normal charitable project. In preparation to this conference, a core committee was instituted and five meetings were held to co-ordinate the organisation and logistics of the event. Each member of the core committee participated willingly and with enthusiasm keeping aside all the other business priorities and commitments on active working days. The strength of the gathering and the participation from Christian Chamber of Commerce and Industry, Dimensions and other business individuals indicates a positive and spontaneous support for this cause. With our eminent resource persons, we hope to have an enriching and healthy interaction in the areas of concern relevant to the topic of climate change, especially issues related to

our daily work processes in a commercial city like Mumbai, in the suburbs and the whole state of Maharashtra.

While establishing and operating a business project, one seldom understands the factors that may affect the climate or realises the impact of the processes being implemented on the various elements of Mother Earth, such as the air, water, soil, animals, plants, trees and the entire ecology; the reasons being pressure of commencement of the activity, commercial returns, financial commitments and many other such factors. I too as the chairman of a printing press and an educational campus was in the same category while setting up and during further expansion of my projects. Each time there were deadlines to be met, reports to be submitted, regulatory norms to be fulfilled - which put me under pressure to meet the deadlines and look at the project from a completion at any cost point of view. As time progressed, with the increasing awareness of global warming, and saving Mother Earth, I too recognised the need for implementing such nature-friendly procedures in my project.

However only after I interacted with the consultants working on green campus, save energy, water conservation, tree plantation, rainwater harvesting, solar power, recycling, waste management, I realised how important it was to give a serious thought to the above aspects while designing and planning any new project at the initial stage itself. Today I had to re-plan, restructure, re-commission some parts of my project in order to be a positive contributor to reduce global warming and save Mother Nature. Friends, you too may be in the same category as me.

Today's seminar under the direction of Pope Francis' *Laudato Si'* encyclical is directed towards creating awareness to the different nature of businesses, be it construction, be it mechanical, manufacturing, mining, chemical, pharmaceutical, travel, transportation or any other business activity. While we are here deliberating on this topic of climate change I wish to bring to your notice that this theme is being discussed not only here but worldwide. The on-going climate change conference in Morocco which is being conducted from the 7th right up to 18th November 2016, is the crucial next step for the governments to look into operationalising the Paris Climate Change Agreement, which was adopted last year and has entered into effect on 4th November 2016.

Pope John Paul II under the aegis of the Justice and Peace Commission invited world Christian businessmen and women and members of the World Bank to address the impact of corruption in the civil society in the year 2004, from May 5th to the 7th. I was fortunate to be a participant from India at this event. It was the opinion that in India there was 30% corruption in the infrastructure and mega public projects with only 70% of the resources accounted for in the projects; whereas in Canada, New Zealand, Norway, Sweden, other Scandinavian countries corruption was the least. As per the information the impact of the seminar increased awareness, and public spending was observed more stringently which led to a certain extent of corruption being curbed.

Today our current Pope's message to the world, through various seminars, conferences workshops throughout the world, hopes to stimulate our conscience as Christian business men and bring about a serious change in awareness and practice in saving Mother Earth in every possible activity, be it at home, workplace and our own enterprises and establishments. So let us participate actively, deliberate wholeheartedly and take up the implementation of such projects seriously. Thank you one and all for being a part of this event.

B. Summary of the Presidential Address by Cardinal Oswald Gracias at the 2016 Conference

Climate change is something which is a reality for us. But what you must do is go deeper than the facts of climate change, first of all, what is the cause of climate change, it is a reality that the temperature of the world is increasing compared to what it was when we began the industrial revolution and as a result there are many more natural disasters than there were before and sometimes you will notice the number might be the same but the intensity is much more. We call these natural disasters, but really they are man-made natural disasters, because we are responsible for it. Because of two reasons, one is we must be conscious that the resources of the earth are not unlimited. With so much of advancement in technology, progress in science, we are using much more natural resources than we did before. We need energy much more than we needed before, and it's cheaper to use fossil fuels. But as we are

using them and polluting the earth, we are also exhausting the natural resources. In the Catechism of the Catholic Church, using these natural resources unlimitedly is a crime against the commandment 'thou shalt not steal'. We are stealing from future generations, taking away from the future generations what belongs to them. We are using now what should be for our children and grandchildren.

The second thing is we also have this desire for profit and now this is specifically for us, for you as business people, entrepreneurs and people who are in industry. We cannot have an unbridled desire for profit - unbridled desire without any principles. You have seen what is happening in business. The G7 meetings were held in Italy and Pope Benedict said that one of the causes of the economic crash, in Wall Street and other places is because of the lack of ethics in economics. At the beginning all the heads of state governments of the leading industrialised nations were in Italy, and the comment was, "well he is a religious leader he has to say", but gradually people began seeing that it was a reality and that they've got to incorporate principles of ethics, instead of considering only the profit aspect. People began taking notice.

I must share with you as Christians, from the Christian theological point of view, two or three principles that we must have in our discussion. First of all, we need a consciousness that we are stewards of creation. God is the Creator and has created the universe, created the world, created us, and he has told us to go and subdue the earth in Genesis. Subdue the earth does not mean that you use everything unlimitedly, subdue the earth means use it according to the principles of the ethics, principles of the Gospel, principles of the conscious awareness that we are all one family, thinking of the past generations and the future generations. So we are stewards, we are not owners, we are not absolute monarchs who can do whatever we want with what is given to us, it is to be used for the betterment of humankind.

The second principle that you must keep in mind is of justice and charity. Though we call one segment of the world the richer segment such as United States, Europe, it does not give them the

right to use all the resources of the earth, and allot a small portion for the rest of the world – this is what is really happening. It may not be fair that the richer countries are using all the resources of the earth and not providing for the poorer countries, similarly we see in our own society, the richer people and cities use more than the people in rural areas, the urban people have and use more of the energy, and we must think of justice in this context also. We need to be even-handed and charitable, to think and care for the poor. And the third principle is to be conscious about our relationship with our Creator. We are creatures you and I, God is our Creator which we accept, but we've also got to have a relationship. We always speak in morals that we must have a relationship with God, and with the other. There is one more element now, building a relationship with nature. Even as we are conscious it has no soul, no mind, but then it is a reality towards which we also have obligations. Now we must also treat nature with respect, creation with respect; these are the principles which I would say, appear in the Gospel, in the Old Testament and New Testament.

You are leaders of the society. You are people who take decisions which will affect the lives of people. Therefore it's important that you reflect on these things and are conscious of the reality. As I began, I said that in Catholic Catechism it is said that if we are using nature wrongly, we would act against the commandment which says thou shall not steal, and I am wondering whether if we continue this way we are acting against the fifth commandment which says 'thou shall not kill'. If we are irresponsible, if we're progressing without bothering about the consequences in the long run, we will be killing our future generations and threatening their very existence. I've already seen films and photographs, of islands in the Pacific which have been wiped away because of climate change, as the water level has risen and they have been swallowed by the ocean. They have even warned us that by the year 2050 if it continues at the present rate, Mumbai city will also be partly submerged under water. I mean we think the year 2050 is so far away and we say we're only in 2016, but 2050 will come one day and our children and our grandchildren will be the ones to suffer.

So thank you for the fact that so many of you have come out here for discussions on this topic which is of utmost importance, which is relevant and which will make a difference. I'm grateful to you and I encourage you to keep up your efforts.

C. Extracts from the Keynote Address of Bishop Bosco Penha at the 2016 Conference

Taking the words of the Ecumenical Patriarch Bartholomew, the Pope reminds us human beings that destroying biological diversity by causing changes in its climate to contaminate the earth's waters, its land, its air and its light are sins. The appropriate response to these sins is what St. John Paul II has already called a Global Ecological Conversion. St. Francis of Assisi is the example par excellence of care for the vulnerable and of an integral ecology lived out joyfully and authentically. He shows us just how inseparable the bond is between concern for nature, justice for the poor, commitment to the society and interior peace.

The Church is very much concerned and involved with these issues, and Pope Benedict XVI has stated that we must be obedient to the voice of the earth, hear the voice of human life and not only must we heal the earth, but we must respect each other at all times. The protection of creation is intertwined with God's call to believe and hope. Pope Francis requests all those who have positions of responsibility in economic, political, and social life and all men and women of good will to care for the earth. Let us all as protectors of creation and protectors of God's plan inscribed in nature, protectors of one another and of the environment, join hands and work together towards resolving this issue as you all constitute a very important category of individuals, without whose support and contribution in your respective spheres of expertise, we will not succeed. So you as businessmen, who possess a lot of power, influence and resources, are key players in trying to help in this problem.

Machines and technology can get rid of a lot of workers; of course it is important for us to try to manufacture things as economically as possible. But we also have to keep in mind the need for jobs for people requiring work; we have to hold back on our technology in order to let people carry on working. Over the years, we're getting

more and more mechanised, and so more people are falling out of jobs; recalling an incident of when I was in Germany, when I visited a bank, there were about 25 employees at the bank at the time and when I went back after 3-4 years I was shocked to see no one in the bank - it was silent, there were just two people and they said, "Father, all these machines have replaced the employees as a result of the technology and new policies".

I think the real message that I would like to give you all is a kind of arching principle for this seminar. An in-depth conversion is needed, what the Pope is saying constantly, is that we can't just solve this problem in a kind of vacuum, while paying no attention to the rest of life. There is a whole situation that the world has got into, which needs to be corrected. There is a conversion that is required on the part of humanity. At the heart of *Laudato Si'* we find these questions - What kind of a world do we want to leave to those who come, the children who are now growing up? Pope Francis pursues these questions as they don't have to do with isolation and environment alone. This leads us to ask ourselves about the meaning of existence and its values as a base of social life.

There was a sudden worldwide explosion and acceptance of pornography, contraception, adultery, homosexual lifestyles, abortion and euthanasia that has led to widespread human, social and environmental degradation of the world. Hence if we wish to stop the process of destroying the universe we have to ensure an in-depth conversion for humanity. Another thought that the Pope shares is that if we are going to agree to abortion which means we are quite ready to kill a child without any problem, what is there for us to kill the earth. The child is a human being and we are ready to kill the child, so what is there for us to kill the earth also. He says that's the whole mentality, we can't just take questions on environment and peace, it's something that is a whole lifestyle and I was very much impressed because he even insists on meditation and prayer and contemplation. Unless we spend time in contemplation we won't realise what the world is really meant for. We only take our own selfish interests into consideration.

In conclusion, we cannot escape from individual responsibility, although we have spoken now about the role of businessmen, it all comes back to individual responsibility. All of us however small, must do our part. Starting from the little things like saving water, electricity, avoiding usage of plastic, using our vehicles with some consideration and so on. I thank all of you as we all join hands to work towards improving this issue, God bless you.

D. Extracts of the Keynote Address by Bishop Allwyn D'Silva at the 2017 Conference

Many events in response to *Laudato Si'*/ climate change have been done but the response from the business people has not been much. The question is “should the business people take care of the earth?” All business is always related to profit, but they need to reflect on their sustainability, in terms of global social economy, and use their profit to take care of creation. Do they value justice and peace through caring for creation? Business houses bear more responsibility to create a sustainable world and are urged to explore sustainable businesses practices; there are quite many going beyond the traditional “green businesses” of recycling and waste management. Eco-efficiency (low waste, non-polluting, local origin if possible, etc.) can lead to dramatic results in terms of reducing material and energy needs.

Waste from a business operation can be problematic in several ways. Disposal can be costly, more so if the waste is hazardous. If an industrial process is wasteful, it also means input costs will be higher. Many companies are beginning to view waste as a measure of inefficiency and several have set a goal of zero waste for their operations. Current energy technologies are creating serious environmental problems and it is possible that global energy supply will not be able to keep pace with anticipated demand. The world is beginning to experience the end of the fossil fuel era, and a transition to renewable energy sources is needed.

Our relationship with the environment can never be isolated from our relationship with others and God. Our dominion over the universe should be understood more properly in the sense of responsible stewardship. Pope Francis urged business leaders to prioritise human dignity, and suggested three ways to do this:

firstly, by moving beyond emergencies to the real priorities, secondly, by being witnesses of charity and thirdly, by acting as custodians and not masters of our planet. Pope Francis said that our planet is a mother for all of us; it asks for respect and not violence, or worse still, the arrogance of masters. We must hand it on to our children, cared for and improved, because it's a loan they make to us. And it's not just Christians who should adopt this approach for safeguarding our earth, it's the responsibility of everyone, he said. But in order to do that, pointed out the Pope, we need to take care of ourselves and not be afraid of goodness, or rather tenderness. We need to safeguard the earth not only with goodness but also with tenderness.

III. CLIMATE CHANGE: CONCEPT, IMPACTS, CURRENT TRENDS AND CHALLENGES

A. Summary of the Session conducted by Mr. Walter Mendoza at the 2016 Conference

Interactions with communities since way back in 1995 revealed that they were already being impacted by climate change. At that time itself, they could see that there was a difference in the pattern of rainfall - precipitation was becoming very erratic: coming early, coming late, much of the precipitation happening at one time, not spread over evenly. Farmers could no longer read the sky and faced challenges looking at the season ahead - what to plant, where to plant and when to plant. Fisher folks too could no longer read the sky to rely on their traditional wisdom that told them where to fish, when to fish, and what kind of fish they would get in what season. The various impacts of climate change are well-known by everyone. However, it is necessary to understand what exactly is happening with respect to climate change, so I'll briefly share a bit of the science involved.

The sun emits rays which pass through the atmosphere before they hit the Earth's surface. Some of these rays are reflected back, especially by the Arctic and Antarctic ice caps owing to the fact that they are excellent reflectors of light. Greenhouse gases create a layer in the atmosphere and obstruct ultraviolet and infrared rays from being reflected back, thereby increasing the average temperature of the Earth. Now we need to understand what we mean when we talk

about 1 degree rise in temperature. As most of us know, the average Earth temperature enables plants to grow, circulates the hydrological cycle and allows so many other cycles to happen – so water is circulated, soil is strengthened, plants grow, animals flourish, we flourish and that's how our life on earth has become so complex and we've reached this level of civilisation today. But all this is under threat because each degree of temperature rise is creating some problems and this is caused by some gases in the atmosphere.

What are those gases? Those gases are mainly carbon dioxide, methane, nitrous oxide and some chloro- and hydro- fluorocarbons. Where do they come from? They come from transportation, electricity, other combustion industries, industrial processes, and land use changes such as deforestation, itself considered to be one of the contributing factors to global climate change. Trees play a critical role in absorbing the greenhouse gases that fuel global warming. Fewer forests mean larger amounts of greenhouse gases entering the atmosphere - and increased speed and severity of global warming. By doing so we are destroying our own habitats and putting human survival at stake.

We talk about development, but is this the type of development we are seeking? We are putting our own survival at risk and destroying our own way of life in the name of development. Climate change in the recent years has been impacting millions and millions of people. It is not just human survival which is at stake but our civilisation as well. In talking about climate change we should make one small distinction. We should understand that climate change is not pollution. So if we consider for example an industrial unit, the by-products of the operations carried out contribute to localised pollution in the form of air and water pollution, discharge of effluents into water bodies, etc. These have an adverse localised effect on the life in the area. It is concentrated within a specific radius of the industry itself, whereas when we talk about global warming and climate change we are referring to a more global issue which is affecting almost the entire world, and therefore we must make that distinction.

Agriculture accounts for almost 15% of the greenhouse gases because of the way we produce foods since the Green Revolution. The Green Revolution meant that we started using chemical pesticides and chemical fertilisers, along with the introduction of machinery to do a lot of the work which would otherwise have been done by people. We have to look at how we produce our food because a significant amount of greenhouse gases, like methane and nitrous oxide, comes from the agricultural practices and cattle rearing. Cattle dung is the prime source of methane in villages, so we need to find ways in which we can make use of it so that it does not contribute to pollution. The problem has been created because of the difference in the lifestyle nowadays from the ways we used to live 150 years ago. Another major contributor to greenhouse gases is methane from garbage. The bigger the city, the more the waste generated, leading to an increasing difficulty in dealing with its disposal due to the lack of segregation at its source.

According to statistics, the per capita greenhouse emissions of certain countries like Australia, Germany, Netherlands, United States and Canada is 4 tons, which is above the global sustainable average of 2 tons. India on the other hand has a per capita emission of 1.6 to 1.8 tons which is much below the global average. These statistics are solely credited to the 800 million people residing in the rural and underprivileged parts of the society; the per capita emissions go up to 6-10 tons in cities like Mumbai. It is due to this enormous contrast that India continues to be behind the other top emitters in terms of per capita emissions. The statistics also show the per capita emission to be 20 tons in developed countries like the United States of America. In recent times these numbers are seen to be following an increasing trend.

So the question still is-'what kind of work have we done on climate change?' Countries like China and South Africa have surpassed their recorded averages and have moved on from per capita greenhouse emissions of 4 tons to 6 tons. In the case of India, the per capita greenhouse emissions has risen from 1.8 tons to nearly 2 tons, so what's happening is we are also joining the bandwagon and our emissions are also increasing. This is a direct effect of our increased consumption, therefore it is the responsibility of each and every one

of us to contribute in every small way possible and do something to improve these numbers.

With each passing year, the intensity of the impacts of climate change can be observed in different countries. The very first impact was seen in France when it was hit by an unexpected heat wave. Then we have also heard about the unprecedented floods in the UK, also California has been suffering from water shortage for a considerable time. The forest fires are advancing aggressively towards the commercial capital of Australia, destroying houses and residential areas in its path - these are some of the many impacts of climate change that can be seen in recent times. But we cannot deal with this issue in isolation - in the sense that we talk about the ecological footprint and not only the carbon footprint. This ecological footprint is beyond just emitting greenhouse gases and it also focuses on other factors such as the consumption of land, use of natural resources, and specially the consumption of water.

As we all know, water is soon becoming a scarce commodity. Mumbai also has had water shortages in the last year. In the past years Mumbai has enjoyed uninterrupted water and power supply, but of course we must remember that in Mumbai, more than 60% of people stay in slums, and 40% stay in housing societies and a small percentage is set in gated communities. So this uninterrupted power and water is only for this 30-40% and still we are having a shortage. Bangalore gets its water from the Cauvery which is about 230 km away. So these are the things that are happening - basically our ecological foot print is far beyond our capacity in India.

The last thing I would like to speak about is understanding climate change in the larger context. The United Nations Framework Convention on Climate Change (UNFCCC) has in the past talked mainly about mitigation by reducing our emissions of carbon dioxide, methane, nitrous oxide, fluorocarbons etc., and adaptation to the impacts of floods, droughts, etc. on existing agricultural practices, general health and other environmental impacts. We as a community have to learn to adapt and grow in the existing conditions. This is a bird's eye view of the issues of climate change.

The Inter-governmental Panel for Climate Change (IPCC) has come forward with a figure for the acceptable limit of carbon and other greenhouse gas emissions, which is at 1000 Giga tons up to the year 2050. According to this concept of 'Carbon Budgeting', we as a community have to limit our emissions so as to keep the global average temperature deviation within a 2 degree range. The environmental problem is actually an ethical problem. So what is required is a dynamic leadership which enlightens and takes us forward.

B. Session by Dr. Priyadarshini Karve at the 2017 Conference

The earth's climate has been changing continually; however, the change in the last century has been unprecedented. The global temperature graph started going up rapidly from around 1900, just after the industrial revolution picked up speed thanks to fossil fuels. The general consensus is that the natural trend of global warming is being enhanced by increase in the level of greenhouse gases, caused primarily by burning of fossil fuels - i.e., undisputedly a modern human activity.

The 'Greenhouse' effect: A greenhouse helps in continuing with agricultural activities even under extreme winter conditions. The glass structure allows sunlight to pass through (necessary for photosynthesis) but does not allow the heat generated by the plants to escape (creating warmth inside). This creates ideal conditions for plant growth inside the greenhouse. Carbon dioxide and a few other gases in the atmosphere have the same effect on the earth, which is responsible for life on earth.

Carbon Footprint: The Carbon Trust in 2008 defined carbon footprint as "the total set of GHG (greenhouse gas) emissions caused directly and indirectly by an individual, organisation, event or product". Carbon footprint is expressed in terms of tons of carbon dioxide equivalent, abbreviated t CO₂e. The global average per capita carbon footprint is ~5 t CO₂e, while the required global average value for survival is 2 t CO₂e. However, the average per capita carbon footprint in developed countries is ~10 t CO₂e, with the least developed countries averaging a value of ~0.5 t CO₂e. The acceptable carbon footprint value is 2 t CO₂e per capita, and India is

the only major emitter whose per capita carbon footprint is below the acceptable value.

Energy-related emissions from Association of Southeast Asian Nations (ASEAN) countries represent 4% of global GHG emissions. As Southeast Asian countries are still developing, the GHG emissions are expected to continue to increase. The major future contribution to GHG emissions is expected to come from energy production and use, transport, infrastructure development; and industries will play a key role in mitigation.

Major Climate Change Impacts for Southeast Asia: In terms of overall ecosystem impacts, increase in rainfall will lead to increase in forest cover. Higher temperature increases the risk of wild fires. The combination of high rainfall and high temperature will also increase frequency and intensity of pest outbreaks. Coral reef ecosystems may die as sea level rises. Mangrove ecosystems will be adversely impacted by variations in the salinity. Freshwater wetlands may shrink due to increased temperature. Such ecosystem impacts typically translate into impacts on water and food availability for human settlements. Impacts on agriculture may be positive or negative depending on location, crop, farming practices, etc. Water availability will be impacted due to increased water management costs caused by high rainfall, extreme weather events, changes in tidal patterns, increased water flow in rivers, more frequent droughts and floods. Coastal Systems will experience high rainfall, increase in tropical storms, changes in tidal patterns, coastal erosion, inundation, loss of land, intrusion of sea water into freshwater channels, with adverse impacts on fishing yields and tourism.

Climate Debates: Climatologists started reporting climate change during the 1960s-70s. In 1988, the Intergovernmental Panel on Climate Change (IPCC) was created by the World Meteorological Organisation and the United Nations Environment Program. The IPCC brought out its First Assessment Report in 1990, based on the views of 400 scientists, which stated that global warming is real and something needs to be done about it. The United Nations Framework Convention on Climate Change (UNFCCC) was created

at the 1992 Earth Summit, and encouraged industrialised countries to stabilise GHG emissions. Since 1995, parties to the UNFCCC have met annually – these meetings are termed Conference of Parties (COP) and aim at assessing progress in dealing with climate change. COP 03 held in Kyoto, Japan in 1997 resulted into the Kyoto Protocol.

The Kyoto Protocol is a far-reaching international treaty on climate change that came into force in 2005 and gave rise to the instrument of Clean Development Mechanism (CDM) or Carbon Finance. The Protocol set binding targets for 37 industrialised countries and the European community for reducing GHG emissions. The GHG emissions were to be reduced by an average of 5% against 1990 levels over the five-year period 2008-2012. A heavier burden was placed on developed nations under the principle of “common but differentiated responsibilities”. Developing countries took the stand of being victims of climate change impacts caused by developed countries; and thus they should be allowed to increase GHG emissions as they needed to increase direct and indirect energy consumption for developing. The developing countries also sought funds and technology know-how to take a low carbon development path.

The first commitment period of the Kyoto Protocol ended in 2012. Developed countries have refused to make new commitments, and no new treaty was agreed upon to replace the Kyoto Protocol. Countries agreed to put together a new treaty that would be legally binding for all nations by 2015, to be implemented by 2020. Due to strong resistance to imposed targets, it was decided that countries would submit their Intended Nationally Determined Contributions (INDCs) before COP 21 in 2015. However, increasing pressure to impose binding emission reduction targets on all nations – as economies of developed countries have shrunk and economies of India, China and a few other developing countries have expanded – resulted in polarisation of the world amongst Annex I countries (developed countries that had binding targets under the Kyoto Protocol), BRICS (Brazil, Russia, India, China, South Africa – fastest emerging markets), LDCs (Least Developed Countries) and SICs (Small Island Countries).

The following consensus was reached at COP 21 in Paris: the global average temperature increase by the end of the century is to be limited to “well below 2°C” while pursuing 1.5°C. It was a compromise between the developed countries’ push for relaxing 2°C, and the push by civil society organisations and many least developed countries for 1.5°C. China (openly) and India (silently) were opposed to lowering the target from 2°C. However, global climate actions under current Nationally Determined Contributions (NDCs) are insufficient for even the 2°C limit, and may take global average temperature increase by the end of the century to 3°C. The USA, a major GHG emitter, withdrew from, and thus further jeopardised the Paris Agreement in June 2017.

There is a clear need for voluntary effort from non-government entities to go beyond NDCs. Increased awareness of environmental impacts and climate change issues among consumers is forcing international businesses to project themselves as a ‘green’ brand. Activities undertaken under corporate social responsibility focused on climate change adaptation (e.g. donating renewable energy devices, sponsorship of ‘green’ events, etc.) while mainstream business activities focused on mitigation of climate change (e.g. investment in renewable energy to offset high energy utilisation, adapting ‘green’ processes in manufacturing and packaging, etc.). Businesses, industries and other entities have also been taking voluntary initiatives in measuring and managing climate change impacts and risks.

An example from India is that the FABC-CCD Mumbai office team with Samuchit Enviro Tech have designed a customised process for conducting green audits of educational and religious institutes. After the Green Audit of the Bishop’s House in Pune, several low carbon and sustainable practices were recommended for ‘greening’ of the campus. The team also offers internships to undergraduate students related to climate change/sustainability challenges in Mumbai city, and has been helping undergraduate colleges in and around Mumbai with a participatory approach for an environmental audit of their own campus. This approach ensures active involvement of college staff and students in greening and the audit report is useful for colleges in the accreditation process conducted by

the Government of India for national level ranking. Also in Mumbai, the Green Parish concept is now expanding into a Green Diocese initiative with the Church leading the way through composting/biogas plant, terrace garden, solar installations, rainwater harvesting etc. Demonstrations, education and support are offered to parishioners. Targeted workshops are organised for citizen groups (women, business leaders, academic groups, church official groups, etc.) to help them explore the link between their lifestyle and professional choices and climate change.

Suggested Voluntary Actions:

- Adopt climate-friendly actions in your own day to day work and lifestyle; Energy efficiency and decentralised renewable energy – urban and rural applications; Waste reduction and recycling/reuse, as far as possible at source; Green buildings and other infrastructure, mainly infrastructure for mobility; Rainwater harvesting, waste water treatment and recycling; Organic and local foods; Land use restoration closer to natural habitat, etc.
- Find out data on your country’s contribution to climate change, and potential climate vulnerabilities: Study existing country level assessment report; Consult climate change researchers working at local and/or national levels; Fund and/or anchor development of assessment report, if required; Study your country’s NDC and National Action Plan – commitments, proposed actions – whether the actions are in line with the commitments and whether the proposed actions and timelines are realistic.
- Educate the masses about climate change, and your country’s mitigation and adaptation needs and intentions: mobilise communities for policy advocacy, if required, at local as well as national level; motivate citizens to respond positively to country’s low carbon and/or climate adaptation strategies; identify vulnerable communities and work with them to build knowledge as well as resilience.

IV. INSIGHTS FROM *LAUDATO SI'* FOR BUSINESS PEOPLE

A. *Extracts from the Address of Ms. Deepika Singh at the 2016 Conference*

Pope Francis talks about "relationship", we can talk of environment problems, we can think of introducing projects, but until and unless we are able to relate to the environment all our solutions are incomplete. He starts the encyclical very beautifully, and terms the Mother Earth as a sister, just like your sister who embraces you, and your mother who nurtures you. He then connects the earth and the environmental problems - if I'm concerned about my sister, I can feel the pain of her getting exploited and being ill-treated, and I might try my best to find ways and means to reduce her troubles. And that's how the context is built for all to be concerned about our common home.

Among some of the issues which *Laudato Si'* has been addressing is one definite fact that the earth has reached saturation point. During our consultation on the Maharashtra State Climate Change Action Plan, one of the experts mentioned that nothing, no efforts can help in reversing the damage done to the planet; nothing can save the earth and all of us from destruction. But Pope Francis is so hopeful; he invites all of us to commit ourselves to find a solution. He calls on everyone to enter into a dialogue with nature. So that is how the spirit of Pope Francis runs through the whole encyclical.

Pope Francis is deeply pained over several factors affecting the environment. One of the main factors responsible in degrading our common home is the mega-industries and projects which are using the natural resources mindlessly without properly researching its impacts on biodiversity, and polluting the earth. The government, with its passing of various economic and other policies is equally responsible. He says economic policies should not be a scale to measure only the growth, it should also alleviate nature; and in nature he means social life, family, children, sexuality, everything. The revolutionary thought of the technocratic paradigm, which the mega- industries are proposing and promoting, is causing the human race to gradually lose its capacity to empathise and connect with nature. This is where Pope Francis is holding us responsible.

He upholds business as a "very noble profession". He also says that everyone has a right to work and a right to dignity of work and he also highly appreciates the small co-operatives and the businesses that employ the poor, as according to him the best way you can help poor people is by giving them a job, because a job is something which gives us a sense of dignity and self-esteem. Although he does lament that the society is disintegrated, and that we are not connected at all, as we are only interested in profits. Addressing the whole shift in the agricultural sector, and the faulty agricultural policies; he is also deeply pained about the urban lifestyle - the whole urban scenario, the way the urban cities are planned and constructed such that they segregate the poor who are migrating to these cities and their inability to access healthy and liveable spaces and facilities in the cities.

The shift to agro-business also worries him and thus he invites the small business people to come up with innovative ventures for production of safe food, innovative ventures in renewable energy, he talks about water management and creating eco-friendly ventures. He strongly calls upon people and governments to push for national and international policies, and come out with innovative ideas. He does not depend on the government as he says it will always align with the rich and politically powerful people. Though a business house/person has a right to profit and prosperity; he says the business people should keep in mind that their business should not destroy Mother Earth while keeping it safe for the future generations.

B. Summary of the Session by Bishop Allwyn D'Silva at the 2017 Conference

Business plays a big responsibility to make the world that we want to be. The encyclical calls us to understand what progress is and to start thinking about managing the economy and our own lifestyle. We have to invest in people. *Laudato Si'* (meaning "Praise Be") begins with the experiences of a world negatively affected by human practices. Pope Francis reflects on these experiences in light of the goodness of God's creation, the human responsibility to care for God's creation, and discipleship as learning from Jesus who was in right relationship with the Father and all of creation. In these reflections, Pope Francis provides not only biblical vision for

evaluating contemporary experience but also an explanation of the root causes of this experience. Based on this, he advocates a vision of integral ecology that recognises the interrelatedness of all things and promotes sustainability, the common good and intergenerational justice. This vision calls for collaborative action between businesses and government to promote the common good, recognising that laws are not simply coercive but also pedagogical in function. This collaborative action in turn depends on an ecological education and spirituality that empowers individuals to change.

We understand from *Laudato Si'* that we are surrounded by the gifts of creation which we have over-consumed, leading to dire consequences for the poor and the planet. And so, it is urgent that we change our sense of progress, our management of the economy, and our style of life. *Laudato Si'* 129 states that "business is a noble vocation, directed to producing wealth and improving the world. It can be a fruitful source of prosperity for the area in which it operates, especially if it sees the creation of jobs as an essential part of its service to the common good". The principle of the maximisation of profits, frequently isolated from other considerations, reflects a misunderstanding of the very concept of the economy. As long as production is increased, little concern is given to whether it is at the cost of future resources or the health of the environment... In a word, businesses profit by calculating and paying only a fraction of the costs involved. Yet only when "the economic and social costs of using up shared environmental resources are recognised with transparency and fully borne by those who incur them, not by other peoples or future generations" (*Laudato Si'* 138), can those actions be considered ethical.

The Holy Father has made several remarks on business; these have been adapted from Pope Francis' addresses to the US Congress on 24 September 2015 and to participants of the International Conference of the Christian Union of Business Executives on 17 November 2016. Pope Francis believes that the wealth business creates should be used to share prosperity. This is because the right use of natural resources, the proper application of technology and the harnessing of the spirit of enterprise are essential elements of an economy which seeks to be modern, inclusive and sustainable. One must also be

cautious of the risks of business, specifically the risks of money, honesty and fraternity.

In the parable of the dishonest steward, Jesus urges us to take responsibility for our friends with dishonest wealth, in order to be welcomed in the eternal habitations (*cf.* Lk 16:9-15). Money must serve and not rule; though it is possible to create business mechanisms that are available to all and that function to everyone's benefit, we must recognise that generous and abundant gratuitousness will always be necessary. The absence of corruption is one of the necessary conditions for social progress. Entrepreneurs may be tempted to give in to attempts at blackmail or extortion, justifying themselves with the thought of saving their company and its community of workers, or thinking that this way they will allow the company to grow and one day they will be able to free themselves from that evil. Entrepreneurs may also think that it is something everyone does, that small acts of corruption aimed at obtaining small advantages are not so important. However, any attempted corruption, whether active or passive, is already the start of adoring Mammon. An enterprise is a community of work in which everyone deserves fraternal respect and appreciation from their superiors, co-workers and subordinates. This respect must also extend to the local community in which the enterprise is physically located, and in a certain sense, all of the enterprise's legal and economic relationships must be moderated, and enveloped in a climate of respect and fraternity.

Cardinal Peter Turkson, President of the Pontifical Council for Justice and Peace, spoke about the Role of Business in Lyon on 30 March 2012 and in Washington DC on 17 March 2016. He stated that the vocation of Christian business leaders is to practice love and justice and to teach the business household, for which they are responsible to do likewise, for the sustenance of all creation, beginning with our brothers and sisters. Business leaders who do not see themselves serving others and God in their working lives will fill the void of purpose with a less worthy substitute, and thus fail to live up to God's call. An economic paradigm "centred on capital gains" has been shown to be obsolete, instead entrepreneurs are urged to focus on doing God's will in the private sector - meeting

the needs of the world with goods that are truly good and truly beneficial, and organising work in a manner that is respectful of human dignity.

Business must always strive to meet genuine human needs rather than feed a culture of consumerism and put jobs before short-term profits. Profit has its legitimate role to play in any business but it cannot be the only role or even the primary role. It is not enough to be a business innovator and a producer of goods; it is essential to produce good work and services which are truly good and which will meet the needs of humanity. Businesses must be honest about externalities or spill-over effects, since finally nothing falls outside of the accounts of our one shared common household; they must not pass environmental costs to others while keeping inflated profits for themselves. Yes, business is to care for our common home, but not according to "business as usual". Instead businesses must find a new and different way of approaching the relationship between people and the environment and of ordering the global economy.

During the official presentation of *Laudato Si'* in 2015, Dr. Carolyn Woo, CEO and President of Catholic Relief Services, made the following comments pertaining to business. The questions Pope Francis poses: "What is the purpose of our life in this world? Why are we here? What is the goal of our work and all our efforts?" are not different from the mission and vision statements that businesses formulate to define their purpose and to gain legitimacy from society, commitment from employees and support by customers. Business has the potential to be a force for good whose actions can serve to mitigate and stop the cumulative, compounding, irreversible catastrophic effects of climate change driven by human actions. Business interests have too often been unkind to these ecosystems, and the correct response according to Pope Francis, is a true ecological conversion involving business as a part of the solution. This means that business must adopt the virtues of solidarity and sustainability, oriented towards the common good and the true development of all peoples.

Business must focus on the creative elements of technology, but always linked to humility and service. Job creation is possibly the

greatest responsibility entrusted to business – it is a sacred trust, and must always be prioritised. To stop investing in people, in order to gain short-term financial gain, is bad business for society; and bad for business as well. More businesses need to be actively engaged in environmental impact assessments. By embracing sustainability, business can help pay the “ecological debt” that Pope Francis claims exists between developed and developing countries. A human-centred approach based on principles of inclusive development can create better economic growth and better economic conditions – growth that benefits the many, not just the few; growth that strengthens local communities and builds resilience; growth that increases substantive freedoms and aids human flourishing.

Design and production that minimises waste by utilising renewable energy sources, improving efficiencies, enabling recycling, reclamation and re-use provides new opportunities for businesses as these enable consumers to do their part. To face the world’s challenges, both public and private sectors need to work together in harmony - sometimes which means business being more accepting of stronger forms of regulation, especially in the financial sector; also business must be fully on board with the UN Sustainable Development Goals and take action to combat climate change. “What kind of world do we want to leave to our children?” If we stay focused on that question, Dr. Woo remarks, we are on the right path.

In conclusion, *Laudato Si’* takeaways for entrepreneurs include: Both markets and business enterprises are precious allies of the common good as long as the ‘part’ (the market) does not try to become the whole (life itself). Companies who exploit people and land negate the very nature of what the global economy is supposed to be, by increasing their wealth at the expense of impoverishing other weaker players. The calculation of cost-benefits which underpin every ‘rational’ decision by companies should include damage to the environment and all living creatures. There is no economic logic that convinces us to leave forests intact for those to come in thousands of years’ time, yet we have moral obligations towards the future generations who will inherit and inhabit our earth.

C. Summary of 'Laudato Si' Message to Business People' by Fr. Michael Vinai Boonlue SJ at the 2017 Conference

Laudato Si' is a message to all of us, from all walks of life, regardless of religion. The Encyclical is a letter to all. One thing we need to understand through *Laudato Si'* is that we need a global economic model not the capitalist model. Addressing the power and deconstructing that model is very crucial to the solution of this global warming.

We have a lot of knowledge but we sometimes forget about spirit with humans as spiritual beings. *Laudato Si'* creates a space for dialogue bringing this into the Catholic teachings, and can be used as a dynamic spiritual exercise. The first step recognises the need for Purification – the encyclical asks what is happening to our common home, to the sister earth: pollution and climate change, the issue of water, loss of biodiversity, decline in the quality of human life and breakdown of the society, global inequality. The next step is Illumination wherein we understand the story of creation, and that we still have an ability to solve the problem. The third step is Confirmation, in which we recognise the human roots of the ecological crisis, and thus realise the necessity of an integral ecology. The last step is Transformation, how to change our world for a better future.

D. Summary from the Talk on 'Implementing Laudato Si' through SDGs' by Bro. Anurak at the 2017 Conference

Catholic social teaching now includes teaching on environment. The ten most important messages from *Laudato Si'*, as envisaged by Rev. James Martin, SJ are:

1. The spiritual perspective is now part of the discussion on the environment.
2. The poor are disproportionately affected by climate change.
3. Less is more.
4. Catholic social teaching now includes teaching on the environment.
5. Discussions about ecology can be grounded in the Bible and church tradition.
6. Everything is connected – including the economy.
7. Scientific research on the environment is to be praised and used.

8. Widespread indifference and selfishness worsen environmental problems.
9. Global dialogue and solidarity are needed.
10. A change of heart is required.

Included in the United Nations Sustainable Development Goals (UN SDGs) are economy, agriculture, agronomy and ecology. This inclusivity is important - why should economy exclude ecology? Combating the widespread and worsening environmental problems requires global dialogue, solidarity and a change of heart. The UN has agreed that climate change is impacting poor people more. Seventeen SDGs with over hundred targets have replaced the former Millennium Development Goals. These SDGs include: 1. No Poverty; 2. Zero Hunger; 3. Good Health and Well-Being; 4. Quality Education; 5. Gender Equality; 6. Clean Water and Sanitation; 7. Affordable and Clean Energy; 8. Decent Work and Economic Growth; 9. Industry, Innovation and Infrastructure; 10. Reduced Inequalities; 11. Sustainable Cities and Communities; 12. Responsible Consumption and Production; 13. Climate Action; 14. Life below Water; 15. Life on Land; 16. Peace, Justice and Strong Institutions; 17. Partnerships for the Goals.

On ground of the communal life of love and unity of the Mountain People Foundation (CLUMP) together with the Agriculture and Food Marketing Association (AFMA), the motto "Sustain Holistic Living" may be used to achieve the UN SDGs. The concept is to focus on "Task force on Agriculture and Food" (not to grow industry, but concentrate on food for people), and create our own standards. Standards are just for the certification process utilised for marketing purposes and are not needed for small farmers / local producers. Rather, by empowering people through accompanying and training, on the actions of the standard certification/agro and business value chains factor, it is possible to achieve sustainable agro-food ecology and sovereignty.

The AFMA Chiangmai Office and a Sustainability Centre were thus established at the LIFE House of Learning & Visibility on January 10, 2017. AFMA presented the concept at the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) Business

Advisory Council at the early February 2017 meeting in Bangladesh and the Council endorsed the operation. We all then tirelessly worked hard, which gave birth to our Quality for Agro-food Standards for Sustainability (QAS) under the logo: LIFE QAS. Sessions to brainstorm followed in series and places whenever and wherever feasible. Meanwhile, the AFMA also worked hard to get people and organisations involved and, through regular consultations with CLUMP, came up with clearer/more inclusive concepts and publications. Following a series of presentations and exhibitions, the Sustainable Agro Food Platform was established. The platform gained recognition at the Sustainable Agro Food Business Forum held on 26-27 September 2017 at the UN Conference Centre in Bangkok, Thailand. During dialogues, it emerged that we should be positive on the future possibilities - because connectivity is accessible to all because generations of people are communicating - and not only do we have faith in Divinity, we have faith in humanity too: younger generations are growing, they will spiral upwards and, though these are but tiny strands of small people, they will contribute to all politico-socio- economic positives, negatives and imperatives and be able to fix the world. There is also a need for a proper balance between businesses and education and that people should be trained and empowered.

Laudato Si' is for all and sustainability is everyone's business.

V. TECHNICAL INPUTS

A. Input on 'Sustainable Business Practices - Opportunities and Challenges' by Mr. Nitesh Mehta at the 2016 Conference

Indian Industry directly or indirectly serves the needs of the society in various forms such as: Food, Clothing, Healthcare, Shelter, etc. Population explosion has led to an increase in demand and a consequent need for expansion. Thus, Indian industries are expanding capacities. Current Reality of Indian Industry: Quality - well accepted, actually preferred; Delivery - fairly reliable; Price - fairly competitive; Regulatory Compliance - at par with world standards. Thus Indian Industry is well respected globally and earned the reputation of being a trustworthy partner across the globe; and has a bright future. A good growth rate is predicted for the next 5-10 years. US and Europe have started looking at India as a

manufacturing hub. Outsourcing by the US and Europe presents a huge business opportunity for India, however business opportunity brings with it proportional environmental changes. With expanding opportunities, industry is growing and so are its environmental challenges.

Industry operations have an impact on Health and Business. There is a huge threat to water bodies and human health due to the enormous quantity of liquid effluents from chemical industries as well as solid and gaseous effluents and wastes from all other sectors (mining, steel, power, etc.). The focus is on end-of-pipe-treatment (converting one kind of effluent into another). Further, toxicity of these effluents is not fully known - eco-toxicity data available for less than 1% of human pharmaceuticals (Regulatory Toxicology Pharmacology, April 2004). Degradation of effluents proceeds at a very slow rate and the impact of degradation products is poorly understood as well. Direct cost to industry includes loss of solvent, raw material and finished product, loss of utilities, high treatment cost, higher overheads, loss of business; whereas indirect costs are unreliable supplies, loss of credibility in market, anxiety, etc. There are also impacts on water resources - 1 billion people need freshwater daily, and water demand of industries is increasing as well.

Strategies are thus required to implement sustainable practices in industry. The usual practice is to assess or speculate damage, but it is very difficult to work out exactly when, where and how damage will impact. This is because these impacts (in Nature) are often very non-linear, and many times the damage is irreversible. Hence, there is a need to adopt strategies to prevent threat / damage being done to environment. A sustainability strategy / program should include actions to prevent threat / impact from arising, actions to protect environment from damage, and restoration to reverse damage that is already done. An example from the chemical industry is the patented Recycle@Source™ Solution which recycles mother liquor after isolation of the product. Client feedback was that even after recycling the mother liquor for over 800 batches, consistent quality of the product was maintained (98%+ on HPLC) and resulted in the saving of millions of litres of freshwater over a period of 3-4 years.

The challenges facing the Indian Industry is to reduce GHG/Environment Footprint while remaining globally competitive and continuing to grow. Mind sets such as “our obligation to be socially/environmentally responsible?” of the top management, “our obligation to develop sustainable products and processes?” of Research and Development departments, “with no ready solutions is it our obligation to stretch to customise solutions?” by Production departments hinder implementation of sustainable strategies. Further, solutions require multi-disciplinary collaborations which industry is not very good at. There is also a lack of information / understanding on sustainable practices and potential solutions, as well as a lack of incentives for both industry and solution providers.

However, we have all it takes to develop and commercialise Green Chemistry solutions. What's needed is to “Connect, Collaborate, Create and commercialise”. Environmental challenges are opportunities to make profits, and barriers are 10% technological and 90% due to human mind set. Looking at our growing population and needs; given our limitations of water and other resources, we don't have much time. There is an urgent need to act. Each of us has a role to play here: Academic and research institutes (working on real, relevant and critical environmental challenges faced by the Industry), Students (skill, talent and energy), Industry (practical experience), Government and Regulatory bodies (facilitate and provide incentives), Financial Institutions (funding), Entrepreneurs (spirit of adventure and ability to take risks), etc. To address our country’s environmental challenges, it just requires all of us coming together and contributing our strength.

B. Input by Ms. Keerthi D’Souza on ‘EHS Regulations in India towards Sustainable Business’ at the 2016 Conference

Many of the environment, health and safety (EHS) legislations are becoming more stringent. While enforcement of these regulations in many quarters continues to remain a cause of concern, there is enough evidence that it is improving. For instance, in 17 highly polluting industry sectors, today over 85% units are in compliance with environmental regulations as opposed to only about 25% in 1991. Environment and Safety legal authorities in India include the Central and State Pollution Control Boards, the Department of

Explosives, Department of Electrical Inspectorate and the Inspectorate of Factories.

Organised efforts were made in the direction of protection of environment in India after the first UN Conference on Human Environment in 1972. The Indian Constitution provides safeguards for the environment in Article 48-a which directs state for protection of environment, and Article 51-a which defines environmental protection as one of the fundamental duties of the citizen of India.

Applicable EHS legislations and requirements in India are listed below:

1. Water (Prevention and Control of Pollution) Act 1974, rule 1975, act amended in 1988, 2011 - consent required for establishment and operation, renewal and compliance
2. Water (Prevention and Control of Pollution) Cess Act passed in 1977, rules 1978, amended in 1992 and 2003 - Form I submission required every month and Payment of cess for demand
3. Air (Prevention and Control of Pollution) Act passed in 1981, Rules 1982 amended in 1987 notification, 2009 - consent required for establishment and operation, renewal and compliance
4. Environmental Protection Act (EPA) 1986, as amended in 1992 - Environmental statement
5. Environmental Impact Assessment Notification - 1994, as amended in 2003, Environmental Clearance, Public Hearing 2002, 2003, 2004, 2006, 2010
6. Noise under EPA 1986, as amended, Second amendment 1998, 1999 and 2002, Third amendment in 2002, latest amendment 2003 and 2004, (Diesel Generator - DG), Fourth amendment in 2002 (Vehicle Noise) - measurement of ambient noise and DG Noise
7. Hazardous and Other Waste (Management and Transboundary Movement) Rules 1989, amended in 2000, as amended in 2003, 2007, 2011, 2016 - application, filing form, maintenance of forms and disposal to authorised vendor
8. The Plastics Waste Management Rules, 1999, as amended in 2002 and 2003, 2016 - 50 microns, fixed Treatment Tariff and spot fine

9. The Batteries (Management and Handling) Rules, 2001, 2010 – maintaining forms, disposal of used batteries to authorised agent
10. The Manufacture, Storage and Import of Hazardous Chemicals Rules 1989, amendment rules 2000 - MSDS, schedule I and II, permission for storage beyond threshold limits and for import
11. The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996, 2015
12. The Bio-Medical Waste Management Rules, 1998 as amended in 2003, 2016 - four categories, Phase out of chlorinated plastic bags / gloves/ blood bags, induction training and awareness every year, immunisation - hepatitis B and tetanus, Bar code for bags, report accidents, no local disposal if treatment site is established within 75 km
13. Solid Waste Management and Handling Rules 2016
14. Construction and Demolition Waste Management Rules, 2016 - waste generator >20 tons per day or 300 tons per project to segregate waste in to steel, concrete, soil, wood and plastic, and submit waste management plan and get approval from local authority
15. E-waste (Management) Rules 2011, 2016 - Schedule I, CFL and others having mercury, Collection is Producer Responsibility, Disposal to authorised vendor, Form 2
16. Noise Pollution (Regulation and Control) Rules, 2000 as amended in 2002, 2006, 2010, 2013
17. The Ozone Depleting Substances (Regulation and Control) Rules, 2000, Notification 2004 - check the gas, replacement plan
18. Indian Electricity Act as amended in 2003 - permission for HT / LT and DG installation
19. Energy Conservation Act, 2001 - purchase of star-rated appliances
20. The Indian Gas Rules, 1981, Bare Act 1995, amended in 2004, draft notification 2015
21. The Petroleum Act / Rules, as amended in 2002
22. Explosives Rules 2008.
23. Static and Mobile Pressure Vessels Rules 1981
24. The Public Liability Insurance Act, 1991 as amended in 1992 and Rules 1991, as amended in 1993, 2008, 2015 – Insurance, Environmental Relief Fund

25. Central Motor Vehicle Rules 1989, Bare Act 2002
26. Shop and Establishment Act under state legislation
27. Building and Other Construction Workers Act
28. Power Business related acts and rules - GERC/CEA etc.
29. Factories Act as applicable / Lifts or Escalators
30. Other Labour regulations
31. Other Compliance obligations identified by the company
32. International agreements and Indian Environmental Legislations - Montreal Protocol, Basel Convention, Kyoto Protocol, Convention on Biological Diversity, UN Convention on the Law of the Sea, etc.

Legal compliance and management involves the identification of applicable legal and other requirements, evaluation of the compliance level and monitoring of the key indicators with respect to procedural requirements, prescribed standards and other requirements.

C. Input by Dr. Priyadarshini Karve on 'Equitable Sustainable Development through Renewable Energy Business Ventures' at the 2016 Conference

This is a very broad overview of what the energy scenario today in India is - most of our energy (approximately 44%) comes from coal. We have coal reserves which are supposed to last for the next 200 years. But coal-based thermal power generation technology has advanced; it requires only a certain quality of coal which would be reasonably less polluting. Unfortunately we have fallen short of the coal supply, so even today a lot of thermal power stations are running on imported coal. So while we say on one hand that we have plenty of coal, actually we are already dependent on others to supply us with coal to generate a lot of electricity that we have.

As far as petroleum is concerned we do not have sufficient reserves to satisfy our requirements; we are dependent on imports, and this dependency is progressively increasing as the industry expands and the oil consumption grows. In recent times we have also tried shifting towards natural gas. Again we do not have enough reserves, although there are speculations galore about where it has been found. Right now we are importing a lot of natural gas; which is coming in the country as liquefied natural gas. In order to import

the gas, it first needs to be liquefied, after which it is transported in tankers, on arrival is reconstituted into a gas and then filled into the cylinders for distribution. So it is seen that at every stage we incur losses. Alternatively, if we could acquire the gas from the country which is selling it by means of a pipeline, then it could reduce many of these losses. Unfortunately the locations of these countries are such that the pipeline would have to run through Afghanistan and Pakistan to get to India. Another neighbouring country which is practically sitting on a natural gas reserve is Bangladesh, however, China has already bound that country in an agreement and most of the natural gas sales are happening between Bangladesh and China. These are some of the geo-political issues.

Now biomass and waste, accounts for almost 22% of the 2012 total energy consumption of India. It represents all the biomass and wood that gets burnt in rural areas for cooking; both household and institutional cooking, and also industrial use of biomass as fuel; hydro-electricity which is about 3%, nuclear which is 1%, and other renewable energy sources other than hydro-electricity and biomass, is about 1%. So this is the sort of a situation that we have right now. Currently we are using more than 500 million tons equivalent of energy (million tons equivalent is a unit that is used to measure energy). It is estimated that by 2025 our requirement of energy will have doubled of what we are presently using. Another interesting piece of data is that out of this energy used in the country only 16% of it is used in the form of electricity. And if you look at the most developed countries, less than 50% of the energy gets utilised as electricity. I would like to make this point specifically because very often we tend to equate energy with electricity, and therefore just by solving the problem of electricity supply it is not going to solve our energy problem.

The above statistics clearly indicate a need to tap alternative sources of energy so as to free us from the dependency on other countries for supply of energy. One of the alternatives is nuclear energy. The data from the Government of India shows that India is currently generating approximately 5 Giga Watts (GW) of electricity from its existing nuclear power plants, also plants capable of generating an additional 5 GW of energy are either in the process of planning or

being constructed, and if you look at the currently applicable energy policy it says that India wants to generate an estimated 63 GW of energy by nuclear power plants by the year 2032. The problem with nuclear power is its current unavailability which puts us back into the situation of dependency on another country but for a different fuel source, it will not make us energy self-sufficient, at least in the starting point. The idea here is that the first generation of nuclear reactors will breed fuel which will then fuel the next generation and so on. The difficulty with planning such a nuclear power plant is the local population in the area which strongly opposes such kind of projects causing delays and increased costs which ultimately forces the termination of such projects.

In the case of solar energy, in India we have the potential of generating 6000 GW of energy. Out of that hardly 1% or so has been utilised. Now we are in a very fortunate situation geographically if we consider renewable energy sources. We have solar potential, wind, and hydro-electric potential. Because we have a long sea shore, there's a potential for generation of energy from tidal wave motion. Another source of energy generation is through ocean thermal conversion. Here the presence of a temperature difference in the layers of the water in the sea is used to generate power. Then geothermal potential is also evenly spread across the country, also we are in a location where biomass grows throughout the year, so we have plenty of that, but how much we have utilised? The highest utilisation of this energy is in the form of hydroelectricity which is less than 25% of the total potential followed by bio-mass which is about less than 15% of the total potential.

If we are thinking of expanding our energy production while at the same time in such a way that we do not depend on others, then the only place where we have room to expand, is in renewable energy sources. This is the reason for the widespread focus on renewable energy, not because of concern about the environment and want to protect it, but because that is the only option. An interesting study which was published way back in 2000 conducted by The Energy and Research Institute looked at 30 years of how India can meet its energy needs. The study considered two probable paths; one of which focused on renewable energy sources. The first step laid

importance on efficiency improvement as the currently used machinery and technology is out-dated and inefficient and was like pouring water in a leaking bucket. So unless the leaks were plugged, everything else that was being done would have no impact. Once we have done the efficiency improvement, according to this projection, we will need about 1550 million tons oil equivalent energy in 2030. With the potential that we have of renewables, we have a capacity to generate much more than that; so we will become an energy surplus country capable of exporting energy by 2030 if we take this path. Interestingly, the other route that was looked at is the nuclear route; it also gives us the same numbers. However, when we talk about energy security, one aspect of it is quantity, and the other important aspect is that the energy should be available in the required form to those who need it.

Considering the case of electricity now, Maharashtra state, specifically Mumbai never has any load shedding contrary to rural areas where 8-10 hours of load shedding is now a daily norm. If we increase our electricity generation capacity, does that mean that the load shedding is going to go down? It doesn't. It only means that more air conditioned malls will come up in Mumbai but the load shedding will always be there. The equity of access to energy is always an important factor when it comes to energy security. From that perspective if we look at renewable energy, it is a prevailing belief that we cannot go aggressively in renewable energy because it is a diluted source. If we want to generate a large amount of energy, a large amount of area needs to be covered. This is actually a wrong way of looking at it. The fact that renewable energy is diluted, and is spread all over is its strength because it gives us the possibility to generate energy where we need it, and not generate it centrally and then distribute it, and control the distribution. In fact because of the decentralisation capacity of renewables, no government is interested to go aggressively into renewable energy, as this would mean the loss of control over how the energy is distributed. Other advantages include - people can generate their own energy and start using it. As mentioned earlier we need only about 45% electricity, even if we become as developed as USA. This means that if we take the nuclear route, the only energy we get is electricity, whereas if we take the renewable route, we can get electricity, we can get heat, and with

biomass we can get a variety of fuels. All the various forms of energy can be harnessed naturally by focusing on renewable energy. Also the employment potential is much higher in the renewable sector than the nuclear sector which is also a significant factor for a populous country like ours.

Looking at the equity factor, suddenly you can see that it makes more sense to take the renewable rather than the nuclear route. The solar mission talks about 100 GW of energy to be generated by 2025; most of it is being planned in the form of large solar farms, which will generate megawatts of power. This will again be distributed in the same way as the current grid operates, so just by investing in this 100 GW project, there is no guarantee that everybody will get electricity. And again the same kind of rural-urban imbalance will continue. On the other hand, if a decentralised approach is taken, since solar energy is available everywhere, electricity can be generated in every village, town and city. Everybody talks about village electrification, when it comes to solar energy etc. but can we take Mumbai city off grid? If we consider utilising the existing roof tops to install solar panels, we can generate enough power to take an estimated 50-60% of Mumbai off-grid. Therefore it should be our responsibility to utilise the available resources and experiment with the new technologies as we in the cities are the biggest consumers of energy and contribute to a majority of the pollution in the environment. It is up to us to reduce our impact on nature and not depend on people in villages to help us out. We talk of subsidies going to rural people, actually they are subsidising us. We need to start thinking along the lines of local and decentralised energy generation as there are many advantages of this local energy access and local energy security.

There are interesting cases in Himachal Pradesh where water mills called gharats have been utilised for generating electricity. A gharat makes use of a water source which is used to rotate a shaft which is connected to a flour mill, during the night the same water is diverted and made to fall from a considerable height on a turbine thereby generating electricity. If the energy is being generated locally, there are zero transmission losses, thus avoiding losses due to fuel costs, refining costs and transmission costs in the case of a centralised

energy generation system. Local employment generation becomes possible and by generating energy using local source, it helps reducing environmental impact and climate change. This will then lead us to sustainable development just by changing our policy or our outlook towards looking at energy.

There are many new technologies like the concept of net metering wherein if you generate a certain percentage of electricity with the help of roof top solar panels, you can sell it to the grid. In the industrial states, because you are buying electricity at a very high cost it becomes an economical viable proposition to generate your own power and reduce your electricity bill. And if you continue generating power even in times when your operations are closed, you have the possibility of selling it to the grid and may end up being a zero electricity consuming company. An IT company in Pune by the name of Persistent Systems has invested in wind power generation systems that the company utilises, which reduces their net electrical consumption to zero. It is a big IT company which has managed to do that, so there are many such options for the industries and also for individuals.

If we want to generate energy, if we want to look beyond electricity, we need fuels. The only renewable source of fuel is biomass. Biomass is a very unique and strange kind of material. Many people tend to mix these two terms, nonconventional and renewable; actually these are two entirely different things. Conventional or nonconventional is something to do with history, whether a source was discovered before 1950 or after 1950. Renewable or non-renewable is different. Biomass is the most conventional energy source that we know of but it is renewable. Trees grow back again, so it is a renewable source of fuel. Each and every type of fossil fuel that we use can be replaced by using biomass resources. However, the moment you start talking about biofuels, there is this huge controversy that, in a country like India whether we should be using our land for growing food or we should be using it for growing fuel. This controversy is based on a misconception. We have an existing agricultural system where we harvest hardly 5-10% of the total biomass that we have grown, rest of it becomes waste and gets burnt in the farm and produces smog like the situation in Delhi. Even the

food items or any other organic material that we get from agricultural practices are processed, thereby generating biomass waste. Technologies exist, with which you can convert this waste into solid, liquid, and gaseous bio-fuels. Now many people say that if you take this biomass out of the farm land then you are also taking nutrients out from agriculture. But when we harvest fuel we are only capturing carbon, hydrogen and oxygen. All the minerals that are there in the plant material will come out as processing waste. This is nothing but fertiliser, it can go back to agriculture, so that completes the cycle while solar energy is the only external input there.

In India we are actually burning up to 800 million tons of agricultural waste annually and the cities dispose about 200 million tons of organic waste. All of this, if harnessed in a decentralised manner can generate about 9 million tons of biofuel which will basically replace about 10 million tons of petroleum import. Why 10 million tons? This is because the biofuel is being generated wherever it is required, so all the diesel we burn in transporting fuel every year gets saved, additionally fertiliser is a by-product of this process so all the petroleum that gets used for producing chemical fertiliser also gets saved.

The technologies are already there for this entire process and the beauty of it is that it is greenhouse gas neutral. There is no net addition of carbon dioxide in the atmosphere. If you look at the carbon cycle today what we see is that there is a geological cycle where carbon dioxide reacts with certain minerals to form a mineral limestone. It is then carried with rainwater and enters the sea. Once in the ocean it precipitates out to form soil and rocks. These are subjected to intense pressures and temperatures due to plate activity releasing carbon dioxide and other gases back to the atmosphere. Then there is a biological cycle, where plants and animals utilise carbon dioxide from air to carry out various life processes and when they die and decompose, the carbon dioxide is released back into the atmosphere.

Petroleum is an algae from millions of years ago which got buried under the earth surface and got converted into petroleum, so the

carbohydrates became hydrocarbons. It happened because at that time there was little oxygen in the atmosphere, so the material could not rot and it could not burn; it could just get chemically converted. Today that is not the case, today we have so much oxygen in the environment, that if anything organic falls on the ground it will either rot away and carbon dioxide will go back or it will burn. So, in every biomass that we are using, the carbon dioxide is anyway going to release into the atmosphere at some point. Hence in the process, when we actually extract energy from it and replace a petroleum fuel with it, there is a net gain, so this can become a carbon negative process. When you pull out a piece of coal and burn it the carbon dioxide that is released is never going to come back whereas if you cut a tree and burn it, when the tree grows back again it will re-absorb the carbon dioxide which has been released. Hence, the use of biomass in energy generation is considered greenhouse gas neutral. Of course there is an assumption that you are maintaining your green cover constant. And that is possible by properly managing how you grow biomass and how you burn it - when you are using agricultural waste that automatically gets taken care of because every year new crops are going to be grown on that land.

There are many kinds of business activities that can grow with decentralised energy generation specially based for biomass. One such example is of a biogas plant which can sit in your balcony or your terrace in an apartment house in Mumbai. Whatever kitchen waste that you are generating can go into it and you will get a little bit of gas which can partially replace the LPG consumption in your kitchen, so for example in this household model if we can put in 5 kg of kitchen waste daily you will not need LPG at all. But obviously we do not generate 5 kg of kitchen waste, we generate only approximately grams, therefore we could find ways to collect organic waste either by having a tie-up with the local vegetable vendors, or with neighbours for the purpose of generating biogas. People have tied up with flour mills - whatever has fallen down goes into their biogas plant. There are many of these small waste things around us which will help us augment our own household waste and generate enough gas to do our cooking thereby saving that much LPG consumption.

Organic waste in the city is managed using trucks which collect organic waste from every household and then burns diesel to take it to the garbage dump and that is where we produce biogas, then the gas is used to producing electricity which is fed into the grid. If you do the energy calculation, you are spending more energy than what you're generating. So we have come up with a business plan, that suppose you provide a service wherein you give the client a biogas plant and you manage it with the help of a meter - they'll pay you by the meter reading, and they'll have the choice of either eventually owning the plant or make use of a plastic tank, so if you don't want it you pick it up and take it out. So it becomes a service-based model which a small or medium scaled enterprise can grow around. These are the kinds of strategies which will allow you to generate energy in the current scenario even with no changes in the current policies.

One final quick point - not everybody is interested in renewable energy, but you can still bring the renewable component in your existing businesses. The first step here is to look at your business from the point of view of its environmental impact, its carbon emissions, which we call a green audit or carbon audit. Some of the simple processes every small industry can follow. Not everybody wants to go in for certification, but you can still follow a step by step process to do this for your own benefit. The first step would include efficiency improvement of the various business operations, followed by a shift from conventional to renewable energy sources, also start to think about shifting to renewable materials. You can replace some of the harmful things that you are using in your business with more environmentally benign material not just in chemical industry, but in all industries by looking at the life cycle of projects. This will not only lead to protecting the ecosystem and reducing your climate change impact but this automatically will also increase the profit margin. Instead of doing for the environment or climate change do it for your own pocket, you will still benefit.

We are trying to handhold people in doing these basic types of environmental and carbon audits in such a way that, within the organisation in couple of years, any person will get enough knowledge to be able to carry forward that process on their own. Our tag line at Samuchit Enviro Tech is 'enabling sustainability'; all

the technologies that we have developed are open source, so I invite everyone to copy and replicate...The question is how do we create awareness among such a whole lot of people? How do we really penetrate and get to the young generation, how do we really educate our youngsters, this is my question.

D. Summary of the Session by Dr. Somnuck Jongmeewasin on 'Environmental Laws in South East Asian Countries: Legal and Regulatory Factors in Business' at the 2017 Conference

In 1984, the recognition of Environmental Impact Assessment (EIA) as a basis for sustainable development in ASEAN was acknowledged in the Bangkok Declaration on ASEAN Environment. It called for strengthening the use of the EIA process and extended Cost-Benefit Analysis for minimising adverse effects and for ensuring proper consideration of environmental values in all projects and programs under the government that are likely to produce significant environmental impact and its gradual extension to the private sector including industry. In 1997, ASEAN adopted Vision 2020 for the ASEAN Community - clean and green with fully established mechanisms for sustainable development. The ASEAN Charter of December 2008 sought for the promotion of sustainable development so as to ensure the protection of the region's environment, the sustainability of its natural resources, the presentation of its cultural heritage and the high quality of life of its people.

In 2012, Article 28 of the ASEAN Human Rights Declaration indicated that "Every person has the right to an adequate standard of living for himself or herself and his or her family including: the right to safe drinking water and sanitation and the right to a safe, clean and sustainable environment. As business activities continue to enlarge rapidly in the region (Factory Asia), ASEAN continues to face challenges (examples: land grabbing, forced labour and health disasters such as the transboundary haze). High profile cases of human rights in 'high-risk' industries such as extraction, agriculture and energy continue to plague the region. For betterment, a transformation from Corporate Social Responsibility (CSR) to UNGP - UN Guiding Principles on Business and Human Rights is being sought along with a focus on 'Due Diligence' - Protect, Respect, Remedy.

Principle 17 of the 1992 Rio Declaration on Environment and Development proclaimed that EIA, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority. EIA may be defined as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals (and other activities) prior to decisions being taken and commitments made. An EIA is undertaken to fulfil the following objectives:

- To ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process.
- To anticipate and avoid, minimise or offset the adverse significant biophysical, social and other relevant effects of development proposals.
- To protect the productivity and capacity of natural systems and the ecological processes which maintain their functions.
- To promote development that is sustainable and optimises resource use and management opportunities.

There are four necessary ingredients for the effective application of EIA in ASEAN. These include: appropriate timing in initiating the assessment so that the proposal is reviewed early enough to scope for development of reasonable alternatives; clear, specific directions in the form of terms of reference or guidelines covering priority issues, timelines, and opportunities for information and input at key decision-making stages; quality information and products fostered by compliance with procedural guidelines and use of “good practices”; and receptivity of decision makers and proponents to the results of the EIA, founded on good communication and accountability.

A number of supporting tools beside EIA exist such as Environmental Assessment, Strategic Environmental Assessment, Social Impact Assessment, Health Impact Assessment, Environmental Risk Assessment, Biological Impact Assessment, Cultural Impact Assessment and Life Cycle Assessment. These are briefed below:

Environmental Assessment (EA) is a systematic process of evaluating and documenting information on the potentials, capacities, and functions of natural systems and resources in order to facilitate sustainable development planning and decision making in general, and to anticipate and manage the adverse effects and consequences of proposed undertakings in particular. Strategic Environmental Assessment (SEA) is a process of prior examination and appraisal of policies, plans, and programs and other higher level or pre-project initiatives. Social Impact Assessment (SIA) is a process of estimating the social consequences that are likely to follow from specific policy and government proposals, particularly in the context of national EA requirements (Inter-organisational Committee on Guidelines and Principles, 1994). Health Impact Assessment (HIA) is a practical approach used to judge the potential health effects of a policy, program or project on a population, particularly on vulnerable or disadvantaged groups. Recommendations are produced for decision-makers and stakeholders, with the aim of maximising the proposal's positive health effects and minimising its negative health effects (WHO, 2003).

Environmental Risk Assessment (ERA) is a process for estimating the likelihood or probability of an adverse outcome or event due to pressures or changes in environmental conditions resulting from human activities. Biological Impact Assessment (BIA) is a process designed to systematically assess the potential or actual impact, including hazards and benefits, of the presence in, the introduction of, or the new entrance into a biological system of specific endemic or exotic organisms (P.S. Teng and X.B. Yang, 1993). Cultural Impact Assessment (CIA) is a process of evaluating the likely impacts of a proposed development on the way of life of a particular group or community of people, both beneficial and adverse (examples: the values, belief systems, customary laws, languages, customs, economy, relationships with the local environment and particular species, social organisation and traditions of the affected community). Life Cycle Assessment (LCA) is a technique to assess environmental impacts associated with all the stages of a product's life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling.

The EIA process incorporates public participation (PP) at various stages, these are: Screening, Scoping, Preparation of draft report and environmental management plan (EMP); Assessment of report and EMP; Approval of report and EMP; and during Monitoring and compliance of approved projects. A key goal of EIA is to reduce the risk of social conflict arising from projects by ensuring that all Project Affected People (PAP) and other stakeholders feel involved, valued and respected in the decision-making on development proposals. To be effective in this regard, PP must occur in a structured and planned way throughout the EIA process. Efforts to involve the public must also be genuine and meaningful, not simply tokenistic or undertaken to complete a regulatory requirement. This PP process must be tailored to the particular needs and circumstances of the participants.

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided (Rio Declaration on Environment and Development 1992: Principle 10). Thus PP should be inclusive (cover all stakeholders), open and transparent, relevant, fair, responsible and credible. It is vital to collaborate with PAP for effective engagement and PP should seek to empower by placing the final decision with the public.

There are several gaps between environmental law and its practice in the ASEAN region, such as avoidance of environmental law, transboundary issues, and the neglect of SEA. EIA law tends to be avoided through size reduction of the proposed project, for example: “9.9 MW Biomass Power Plant without EIA requirement” instead of “10 MW Biomass Power Plant with EIA requirement” in Thailand. EIAs also tend to suffer from poor PP, ineffective EMPs, intention to not follow EMPs strictly, focus on only scientific knowledge with

disregard of community knowledge, and narrow scope with respect to PAP as compared to size and type of proposed project. Further, in some countries, environmental law is avoided by way of new waive laws raised by government, so as to attract Foreign Direct Investment in a Special Economic Zone.

Further, project proposals with potential transboundary impacts have some unique assessment and public participation issues. The way that project proponents engage stakeholders in neighbouring countries will require the involvement of the national governments, as well as, a range of diplomatic and legal considerations. There is recognition under international law that countries have an obligation to undertake an EIA where there is a risk that the proposed project may have a significant adverse impact in a transboundary context, in particular, on a shared resource. ASEAN has already tried to address activities such as pollution, haze, trade in endangered species and natural disasters that are likely to have a transboundary impact. There exists activities and projects, such as hydropower projects, coal-fired power stations, nuclear developments and industrial or resource exploitation projects, that whilst being confined to only one country may have an impact beyond that country's borders. Projects or activities that may have a transboundary impact should be properly assessed prior to approval.

SEA Trends in ASEAN - SEA is an analytical and participatory approach for mainstreaming and up-streaming environmental and social issues into decision-making and implementation processes at the strategic level. SEA Systems have been developed in North America and Europe for sustainable development since the 1970s, but are typically less well established elsewhere. Given the rate of development and the massive environmental implications of many planning decisions that are currently being made in the region, the need for effective SEA tools is great. The World Bank is: assisting client countries in ASEAN to introduce and develop SEA in the context of development policies; providing non-lending technical support and analytical services in the ASEAN region, including policy assessment and reform; offering a wide range of analytical and advisory services including pilot SEA projects and training

workshops and courses throughout the ASEAN region; and highlighting the need for SEAs to be undertaken in areas where projects and programs may have cumulative and sector wide environmental and social implications.

Vietnam, Indonesia, and Philippines have fully established and implemented SEA with legal frameworks, specific guidance, and increasing practice. ASEAN countries which have started to elaborate SEA frameworks (and / or are implementing SEA pilots) are Thailand, Lao PDR, Cambodia and Myanmar. Thailand and Lao PDR have developed proposals for SEA, which are awaiting formal adoption. PP is incorporated in SEA as well, so as to increase transparency and credibility of decision-making, ensure all relevant issues are considered during plan / program development, allow early consideration of stakeholder opinions and concerns, mobilise support for PPP (Policy, Plan, and Program) and its implementation. Stakeholders in SEA are those directly affected by the plan, those who represent the affected, those who can actually influence implementation of the proposed plan, and those who can provide useful information for SEA - those with data on environmental issues, know about the planned future projects that will affect the local environment in the study area, or who have ideas of alternative development options that could be analysed within the proposed plan.

ASEAN's sustainable future with the SDGs - ASEAN taps on Vision 2025 to support SDGs, recognising "the importance of creating synergy between the mutually-reinforcing ASEAN 2025 Blueprints and the Sustainable Development Goals (SDGs) within the framework of ASEAN-UN cooperation"(ASEAN Deputy Secretary-General for Socio-Cultural Community H.E. Vongthep Arthakaivalvatee, 25 June 2016). Thus the establishment of a SDGs Impact Assessment Tool for the ASEAN community is envisaged. Broad biosphere related impacts would be assessed through goals: 15 - Life on Land, 14 - Life below Water, 6 - Clean Water and Sanitation, and 13 - Climate Action. Society related impacts would be assessed through goals: 1 - No Poverty, 11 - Sustainable Cities and Communities, 16 - Peace, Justice and Strong Institutions, 7 - Affordable and Clean Energy, 3 - Good Health and Well-Being, 4 -

Quality Education, 5 - Gender Equality, and 2 - Zero Hunger. Lastly, economic impacts would be assessed through goals: 8 - Decent Work and Economic Growth, 9 - Industry, Innovation and Infrastructure, 10 - Reduced Inequalities, and 12 - Responsible Consumption and Production. Goal 17 - Partnerships for the Goals would encompass all three spheres of economy, society and the biosphere.

E. Summary of the Session by Dr. Priyadarshini Karve on 'Introducing Corporate Climate Responsibility' at the 2017 Conference

The unsustainability trap results when the ecological footprint of human civilisation exceeds the available area. 71% of the present global population is sustained through a lifestyle predominated by hunter-gatherer and subsistence agriculture (i.e. ~5 billion people with a daily income ranging from less than 2 to 10 US dollars. A partially industrial and agricultural lifestyle sustains ~1 billion people (13% of the current world population), each with a daily income between 10 to 20 US dollars. Fully industrial lifestyles support 16% of the population (~1 billion people), each with a daily income ranging from 20 to over 50 US dollars.

Given current development and population trends, as the population rises to 10 billion, only about 2 billion people can live 'in comfort'. About 8 billion people will have to live in relative poverty to sustain the lifestyle of 2 billion people. As information technology brings the world closer, the competition for a place in the top 2 billion becomes more intense, leading to increasing conflict and environmental degradation. Thus, it is imperative to find an alternative path of development that will allow most of the 10 billion people to live in relative comfort; this can be achieved by creating a new socio-economic system, and not by going back to traditional lifestyles will only sustain about 1 billion people or by continuing with business as usual that will tear the world apart with conflicts and destruction.

Development and selection of technologies and policies at country, city or community or organisational levels should be guided by the following limits - local environmental impacts, socio-economic inequity and carbon footprint and climate vulnerability. Business has a role to play within its sphere of influence to help local

communities and the country find the right combination of policy and technology to achieve low carbon sustainable development. The contribution of a business to local, national and global economy can be extracted from financial data, and its environmental impacts through legal compliances and environmental audits. Even the economic and environmental risks of a business can be measured through standard risk assessment processes. But how many businesses measure their climate change impacts and their vulnerability to climate change through carbon accounting?

Greenhouse Gas Protocol Initiative, launched in 1998 and anchored by the World Resources Institute, is an effort led by NGOs and businesses in the developed world. Its mission is to develop internationally accepted GHG accounting and reporting standards for business and to promote their broad adoption; and has already created the GHG Protocol Corporate Accounting and Reporting Standard. Endorsed by many international bodies, the standard serves as a basis for the Carbon Disclosure Project, the most widespread international non-profit effort to account for and annually disclose GHG emissions of all major corporations in the world.

Accounting for GHG emissions relies on the following five principles:

- Relevance – Ensure that the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of external and internal users.
- Completeness – Account for and report on all GHG emission sources and activities within the chosen inventory boundary; disclose and justify any specific exclusion.
- Consistency – Use consistent methodologies to allow for meaningful comparisons of emissions over time.
- Transparency – Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.
- Accuracy – Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable.

Carbon Market is different from Carbon Auditing. In Carbon Market, the focus is only on measuring emission reductions. Individual projects could propose own methodologies for measurement and calculation. The project period is limited and the objective is to monetise emission reductions. In contrast, Carbon Audit focuses on accounting for all annual carbon emissions of the organisation. Standard auditing principles, similar to financial audit, are used for each type of organisation. It entails a long-term vision to make organisations climate-friendly and the objective is to track emissions to achieve progressive decrease over the years.

Carbon Auditing begins with the setting of organisational and operational boundaries. Emissions are measured for all operations in the physical premises, as well as supply chain partners, service providers and customers. Focus is only on operations under financial control, administrative control, and within physical boundaries. The emissions associated with organisational operations are then identified and categorised. Scope 1 emissions are direct emissions from: generation of electricity, heat, or steam; physical or chemical processing; transportation of materials, products, waste, and employees in company-owned vehicles, and; fugitive emissions, such as hydrofluorocarbon emissions from air conditioners. Scope 2 emissions include indirect emissions from purchased electricity or heat. Scope 3 emissions are indirect emissions from: extraction and production of purchased materials and fuel; employee business travel; transportation of materials, products, waste, and employees in hired vehicles; electricity-related not included in Scope 2; leased assets, franchises, and outsourced activities; use of sold products and services, and; waste disposal.

After emission sources are identified and classified, a base year is selected. Base year emissions provide a useful reference for tracking the emissions of the organisation with time. Ideally, it should be the year of inception of the organisation; in practice, the first year for which detailed emission data is available functions as the base year. It may also be the average of several consecutive years – this helps to even out anomalies. Base year emissions may be recalculated in case of merger, acquisition, disinvestment, outsourcing or insourcing emitting activities, and when changes occur in calculation

methodology. Relevant data is then collected, emission factors are selected, and emissions are calculated using appropriate tools. The results are verified by top management and reported on appropriate platforms.

There is tremendous scope opening up for Green Businesses for brand building. Internationally, big companies are already declaring their carbon emissions and there is a need to join in the new business culture. Particularly in Asia, small and medium enterprises are bigger contributors to economy, and their emissions contribute to the total emissions of large multinational corporations. Reporting of big companies will improve as the quality of data from their supply chain partners improves. Further, low carbon development will become a grassroots movement if small and medium companies in developing economies start auditing and publicly disclosing their annual carbon emissions. The process will also impact owners, shareholders, employees, etc.

Businesses can make a start by visiting ghgprotocol.org for more information. Industry Associations should be roped in to commit to a carbon audit process and self-disclosure platform best suited for the industry in context of the country. Since international organisations, including the World Resources Institute, have focused mainly on multinational or large corporations operating at the level of the entire country, customised tools and processes for small and medium businesses in Asia can be developed. For instance, Moringa Oleifera Corporation and Samuchit Enviro Tech have made a start in India by creating a service aimed specifically at small and medium businesses in Asia, using a carbon audit tool.

Nexus for Development is a non-profit organisation registered in Singapore and operating out of Phnom Penh, Cambodia. It operates in the form of a co-operative of member organisations; which are supported in a variety of ways to use their potential to improve people's lives in the face of poverty and climate change. Support is provided for accessing financial and resources so that member organisations can deliver positive environmental impact and improve the lives and livelihoods of millions of people; nexusfordevelopment.org may be visited for more information.

Nexus membership is open to: organisations working to deliver low-carbon solutions to meet energy, water, agriculture or sanitation needs in Asia or Africa; legally registered non-profit, non-governmental organisations or legally registered for-profit corporations with a strong commitment to social improvements and environmental protection; and organisations striving to work together to support each other based on mutual respect. Members are willing to share knowledge and lessons learned on how to access finance and scale low-carbon development projects and activities.

Beyond businesses, carbon audit process and disclosure platform can also be developed for civil society organisations and / or educational and religious institutions.

VI. SHARING OF GOOD BUSINESS PRACTICES

A. Sharing by Mr. Vincent Matthias on Packaging Industry Waste at the 2016 Conference

I am in the packaging industry and started out in 1987, as such the corrugated boxes in the packaging industry is an eco-friendly product. This product has been a boon to this planet as it has saved millions of acres of land from deforestation. It is predicted that in the near future even the wooden pallets will be replaced by corrugated palate. I have managed to start a factory in Goa, a tourist destination; because it is completely a green-field project, I could initiate environment-friendly activities. So this new factory premises of mine in Goa covers 4 acres of land.

We had taken the Sedex Certification, which was needed to get us an approval in many of the multinational companies, FMCGs basically. Once we received the Sedex approval, we were required to formulate our environmental policy. We have displayed this policy in our factory, and we will discuss about this policy and how it will help the environment. Our environmental policy is our safety and health policy; and is based on the principles that excellence in the area maximises the long term value that the Velvin group brings to the employees, communities, our customers, shareholders, and the environment. Why should we do this? In what way has it helped us as businessmen? As all of us are business people, how has it helped us improve our companies' image and reputation? It has helped us

by improving the community relationship and though cost savings achieved through improvements in the system efficiently.

We display the policy at different places so that all employees of my organisation, each and every person is aware of the policy. We have allocated the responsibility, whether it is ETP plant, or power, or generation, we have allocated different responsibilities to different people and provide training opportunities. Once a month we have a meeting, where we discuss the policy in the organisation. The various risk factors to the environment are discussed. In our factory, we have taken an inventory of all the raw material. You may think - how is it going to help the environment to take inventory of raw material? Suppose in a sheet if you used 50% of the material and 50% goes waste, we redesigned the box in such a way that the maximum can be used, so that raw material consumption can be reduced. That is how we have worked upon our policies, water usage, energy use methods, power supply, diesel, water, etc. have been considered in the inventory of raw materials. Also for the boiler we require briquettes - we use cashew shells. Mangalore is close by and it works out to be very cheap for anybody who works in this industry.

Obtaining the consent to operate the plant is required; we have taken the required permission, without which it is not possible to start an industry. Now adhering to the conditions outlined in the consent, commissioning the Effluent Treatment Plant (ETP) and monitoring it on a daily basis was necessary. We don't generate a lot of waste since almost all the paper waste goes for recycling but still we have some waste, like ink which is used when we wash the machines. This ink has chemicals pigments in it and we have installed an ETP plant with which we separate the dark pigment and water, after which the clean water is discarded. Stack height of the Diesel Generator and Boiler are required to follow certain norms, we have ensured that stack emissions and ambient air quality are within the standards set by the Pollution Control Board. It is evident that implementing measures and technology for reduce, reuse and recycle of resources prevents wastage.

We have done certain small things like display of notices regarding switching off the lights, air conditioners and computers when not in use; save water, reduce waste etc., all around the factory premises. We have put up notices in the Hindi language as well. Some signs are displayed in different places regarding waste categorisation and collection in different bins. We had introduced 4-5 different bins to encourage waste segregation at source, and have replaced all other lights, including street lights, with LED lights. For rainwater harvesting we installed a very big tank, where rainwater from the roof is collected, and this water is used when there is no rain. We brought a number of fruit trees from Mangalore and Goa and planted them around our factory where open land is available. Canteen waste is collected and used to create manure with the use of enzymes. We have started working on sensor-based flash taps to reduce the usage of water. We are also working on small external lighting pilot projects in which we have put solar panels of ~200 KW on our roof to power all the external lighting which is used during the night. We preserve the electricity generated during the day with the help of batteries, and utilise it during the nights. In case it falls short, power from the main supply is taken.

Another small initiative is carpooling for employees so that everybody doesn't bring in their car. Energy audits are conducted so that we are aware of the energy consumption of the different equipment present in the facility - how much load they are pulling, whether the equipment is overheating, these are the various aspects that the energy audit represents. We have also installed sub-meters wherever the consumption is high. These are some of the initiatives we have taken in our factory which have given us results.

B. Sharing by Mr. Pankaj Sharma on 'Best Practice in Industry and Environment Compliance' at the 2016 Conference

Normally everybody nowadays is talking about compliance, regulations, so the question that comes in the minds of businessmen is 'how I can make profit out of compliance?' We have worked on the principle that ethics should also be implemented with profits. We are an API-manufacturing facility situated in Vapi, Gujarat. We have 360 metric tons per annum capacity of pharmaceutical bulk drugs. It is difficult to implement the things in the chemical industry because you have the wastewater, you have the recyclable solvents,

and you have a lot of hazardous chemicals to deal with. So we are sharing our experience of how we can come up with the facilities, with a profit margin and compliance.

In the old concept people believed that non-compliance is the best, you do everything under the table and things will get resolved. But in the present scenario, compliance is more profitable than being a non-compliant industry. Because of the way the rules are changing, this is a very important need in every industry whether it is paper, plastic or chemical, and in the coming future you can only make profit if you are compliance-faceted, because it is a commitment which we are giving to our customers. If I have a non-compliant facility and if it gets closed tomorrow, my customers and the common people who are struggling with disease in case of a pharmaceutical industry will directly get implicated as a result of this. We have to thus come into the mainstream, we have to think on compliance and we have to implement it.

Swati Spentose Pvt. Ltd. (SSPL) is global regulatory compliance facility across dimensions. We are in compliance not out of compulsion; we comply out of choice, an intelligent choice. We comply across almost 30 government regulations including a complex grid of excise, FDA, GPCB, and Prohibition where usually records are crosschecked. We have set internal goals and proved to ourselves that compliance is 10 times cheaper than non-compliance in economic terms and 100 times worthy and profitable in terms of moral and pride value. In our view, global and Indian guidelines, like all other regulations, are fundamentally driven by a simple ethos of good practices in their respective areas.

We have an internal fundamentally clear policy that compliance is a choice and not a compulsion. It is an attitude and mind-set and not an assignment or job. We are best in environmental compliances, FDA Good Manufacturing Practices and EHS with prime focus on health and wellbeing of individual members. We are emphasising on preventive health care and increment based on good mind and physical health. For the same we have pre-employment medical check-ups followed by annual medical check-ups. We are in the

process to implement policies for better lifestyle and stress-free environment at the workplace.

We are at the top with respect to compliance in Vapi out of almost 725 factories. Our Effluent treatment facilities have been appreciated and visited by Pollution Board. The business part which is normally underestimated by industries is that we have taken priority with every record for our 18 tanks of effluent treatment plant by quality, quantity for over 6 years from day one of start of our work; exemplifying our intent to be honest and compliant by choice fearlessly. At times we have had gaps in the limits we have to maintain due to normal fluctuation in criteria which are within acceptable chemical process limits. Whenever feared or got pressured by ignorant consultants and government employees, each time we went to the heads of Pollution Board, explained the truth in an honest and scientific manner and resolved the matters without doing adjustments, paying any bribe and in the process we learned that every regulation has room for error defined by rule. It is just that consultants and most government employees don't know these sub-rules properly and stop using logic as there is money to be made. If you have the intent and be fearless they will be obliged to bow, provided you ask simple logical questions. Questions are very important and more important that they be answered.

Everyone can implement and make 100% compliant platforms. For new projects in the design phase, you need to hire honest advisors by checking their past references from clients and how their designs have performed and then observe from discussions their knowledge base and attitude in dealing with what they don't know. Do they cut, paste, copy, ignore, or first accept that they don't know and go and learn. These are the fundamental indicators which will make you start with right people, if you start with right people; your end success is guaranteed even if you face hurdles. Everyone is welcome to contact us to ask directions. For old projects you need to have the intent and the financial ability to hold, take a step back, review properly, re-design, implement and then get on track. The short term costs, losses and pain is worth the long term profits, pride and respect you see in your own eyes first and then in your employees, associates, buyers, sellers and everyone else including our own

family and friends. We have done this in FDA, Pollution Control Board and excise. It can be practiced almost across dimensions as fundamentals are the same- if you get the DNA right you will find answers and solutions everywhere.

The only challenges are in our own mind and if we at the helm resolve to go the right way and be willing to accept the pain and be patient and not be diluted by ignorant people, success is guaranteed. So when we started we were fundamentally clear that we will comply 100%, not be threatened by anyone. We were willing to lose and face consequences of any kind but stick to path of truth, and the most surprising thing we learned was that, only dumb ignorant people threaten, they are like ghosts - the moment you face them they disappear, the intellectuals co-operate and help and hence you are welcome to come to us with your issues and we will be happy to prove/explain our point. We are not god but we believe it can be established across spectrums and industries.

We are empowered and inspired by our experiences. Truth is simple and simplicity is powerful, we have seen the power of truth, the power of it in multiplying money and multiplying self-esteem and respect in our own eyes first, and then in the eyes of our employees, associates and stake holders and when they share their pride with their family and friends. Truth is absolute, lies can be many - but truth is only one and is more powerful than the deadliest nuclear weapon of the world. Dishonest and ignorant people fear honest people, while the intelligent love the true people. Nothing is more powerful and absolute than this.

I don't want to go on endlessly, so we can focus on our own mind and intent and understanding so that we know what we are doing and why we are doing and this will drive the whole conclusion. It is like this quote of British physicist David Bohm - "If man thinks of the totality as constituted of independent fragments, then that is how his mind will tend to operate, but if he can include everything coherently and harmoniously in an overall whole that is undivided, unbroken, and without a border then his mind will tend to move in a similar way, and from this will flow an orderly action within the whole."

C. Sharing by Mr. Rudolf D'Souza on 'Rainwater Harvesting' at the 2016 Conference

I'm actually surprised that after 13 years I'm still talking about rainwater harvesting. I thought everybody must have implemented it because rain water harvesting is something that we can do fundamentally.

People have always grumbled about water; if we go back to the Bible to the time of Moses - people grumbled and they said why have you brought us out here in the desert, so actually, grumbling about water is nothing new, so what did Moses do? The Lord said, "Go to the rock of Horeb and strike it twice". And what happened? Water came out. But today water does not come so easily. Hence when people grumble about water today, the leaders listen and put up a desalination plant or put up an expensive dam. But there are simpler solutions. By the way water is very risky business. So now one of the basic things in most of our campuses, whether commercial or residential, is that we have dug bore wells. What do we do with bore wells? We constantly pump water out. Now rainwater harvesting is a very simple technique, during the months when monsoons are there we just push the water back into the ground. Remember rainwater harvesting is not expensive at all. And it can be done anywhere. Let me show you a bit of the techniques.

Shah and Shanghai at MIDC have a huge campus but water is expensive. On interacting with them we learned that they had a bore well which was not yielding water and so we connected the rooftops to a recharge pit with the help of thick pipes. The water collected from the roof tops was made to pass through a filtration unit before entering the bore well. The filter needs to be periodically cleaned to ensure clean water. Remember rainwater harvesting is a one-time investment and thereafter it's about maintenance. We have got other corporates like Larsen and Toubro, Powai campus where we have done recharging of the existing well with the help of rainwater harvesting. Another project of rainwater harvesting was carried out at the Bombay Stock Exchange. Now you will be surprised, you will think how can they harvest rainwater on a building like that - they don't even have a bore well. What they do is, during the monsoon months, they clean up the terrace, and water

that is incidental on the roof top after the first week of rains is filtered and collected in an underground tank. This water is then used for flushing. For three months they save a lot on the water bill. So each case is different but we try to help you so that you can do it in the least cost, we don't want you to spend extra money unless you don't have water.

When water is not available then it becomes expensive, and we try to help organisations to harvest rainwater in a most cost-effective manner as possible. We have managed to install rainwater harvesting units in various churches like Salvation Church in Dadar, Don Bosco's, etc. Additionally, we have also done it for various institutions and campuses like Bosch in Bangalore where you can actually see the rainwater recharge is passing through the road itself. You begin with digging a pit in a predetermined area; this is called the recharge pit. This pit is connected by means of pipes, to the terrace or other open spaces. The pipes carrying the rainwater first go into the trench. This trench is built up with honey bricks on either side while the base is left open. At the base, a layer of charcoal and lime is laid which functions as a filter unit for people who don't want to put a commercial filter. If you are only recharging groundwater we suggest you use simple recharge material.

In 2005 during the floods, Yari Road survived because of the ring well system installed by the society. The water was simply gushing into the recharge pits and into the ring well that was created and the society did not get flooded. When the BBC crew heard about it, they came and interviewed the people about this rainwater harvesting system. Techs Corp has also installed this system so you can see how the water is taken from the roof top through pipes to the recharge pit which finally empties into the bore well. We try to create a recharge pit as close to the bore well as possible but not directly over it, so that the filtered water gets straight into the bore well.

Surprisingly, residential water is charged at Rupees 3 per 1000 litres, hospitals are charged Rupees 16 per 1000 litres whereas for commercial establishments it's Rupees per 1000 litres. So it makes absolute commercial sense to implement rainwater harvesting

systems. Many of us don't realise that we also pay for purifying our water. What about the electricity consumption for water purifiers? The market size today is approximately worth 4000 crores, growing at a compounded rate of 20% per annum. Annual maintenance charges work out to be approximately 1000 crores, these are the hidden charges that you are paying and you don't even realise. Similarly, the bottled water market itself is greater than 10,000 crores. I also noticed today during this program, water was distributed in PET bottles to everyone. This could be avoided by arranging 20-litre bottles which would reduce the waste generated in the form of plastic.

We all know that the Earth is a blue planet with 71% of its surface covered with water, while precipitation is the only source of fresh water. Some of this rainwater run-off gets into water bodies like lakes and ponds while part of it percolates into the groundwater table. India is blessed with very good monsoons yet water scarcity is a growing worry in recent times. One of the main reasons for this is human activities, including excessive usage, pollution of the water sources, etc. Although water is abundantly available in the city of Mumbai, most of the existing water sources are polluted. We thus need to join hands to find a solution to the problem at hand.

A groundwater survey showed that water in the ground could be as much as 3000-4000 years old and was used as an underground reservoir; however today, due to unchecked usage of underground water through bore wells, India is one of the biggest consumers of groundwater in the world. Sadly, we have not made any efforts to replenish this water up until now. The concept of rainwater harvesting solely focuses on replenishing the groundwater table and so promoting it is the need of the hour. Rainwater harvesting projects are highly beneficial in the long run, not only do they help in replenishing groundwater, but they also help to reduce the dependency on metered water. Ten years ago all the bore wells in our housing society went dry and we were forced to install a rainwater harvesting system to help replenish groundwater. After just 5 years, the water levels underground have improved drastically, after which we did not bring a single tanker into our society and saved more than 8 lakh rupees in water.

So I would like to thank the organisers, for this great session today and if any of you need any help on rainwater harvesting, please feel free to talk to me; I'm willing to help you out if you need any expertise. I'll put you in touch with experts for this.

D. Panel Discussion on 'Transition to Renewable Energy in the Dioceses of Philippines' at the 2017 Conference

The panel comprised of experts partnered with the Council of Laity of the Philippines and consisted of Julito Sarmiento, Co-founder and President of WeGen distributed Energy, Philippines, Michael Saalfeld, Founder, Chairman and CEO of Litchblik-Power distributing company and Raymond Daniel H. Cruz Jr, Managing Director at WeGen. Training, values formation and education are among the activities when communities are approached for solar panel promotion and installation. Skills' training for the technology is provided and this will go to the people as a trust fund so the ownership is clear. This is a new form of entrepreneurship, and addressing this industry is a big help to mitigate climate change. There is the power for innovations/change for better living and is sustainable even for the poor. Renewable energy is an entry point for spiritual with ecological change for the people.

E. Experience as an Entrepreneur - Sharing by Mr. Lau Boon Ping at the 2017 Conference

Lau Boon Ping, Director at Olive Energy - a Biomass Power Plant in Malaysia

shared his journey as an entrepreneur to bring to reality a palm waste to electricity power plant in Sarawak, Malaysia, a power plant converting rice husk to electricity in Kedah, and some other interesting technologies dealing with low carbon emissions. What was found remarkable in his journey was his faith experiences and struggles as a business person.

VII. WAY FORWARD

A. Concluding Session at the 2016 Conference

The following points were proposed by Fr. Allwyn D'Silva, after which the views of the participants were sought - Networking with the Climate Change Desk and Christian businesses should be carried on; unless difficulties are communicated and shared, finding

solutions will be farfetched. It is very important to carry on the awareness in our lives and our businesses; awareness is the need of the hour and not restricted to the Christians, but open to every individual in companies. Eco-tourism in Mahad, Raigad could be helped by creating a green fund to support eco-friendly initiatives. Research can be conducted on how eco-friendly practices may be inculcated in the day to day functioning of businesses. Much more needs to be done for awareness creation, this is the first meeting involving the businessmen and to take this experience to the next level, should we create a common platform for the Christian businessmen along with the Climate Change Desk involving all the other business individuals who are not here today? Further, awareness and training needs to be done for the people, there is a need to be systematic and conduct presentations and projects at the institution level as well as at the factory level and residence levels, etc.

One of the participants suggested providing scholarships and conducting annual exhibitions for education on environment and climate change in institutions, schools and colleges through the Climate Change Desk. The genuine and unique efforts of the students and other individuals in the field of environment and climate change should be recognised. Scholarships could also be offered for engineering, or for higher studies. Another participant shared his views by saying that this conference on climate change was an educative experience and suggested having more such events and seminars in different places where more Catholics could participate. Another individual suggested having a follow up meeting in December or the second week of January, and also another similar event involving the Christian Chamber of Industry, Dimensions, the parishes and the Catholic Sabha.

The chairman of the Christian Chamber acknowledged the knowledge and resourcefulness of the different speakers of the conference and suggested having another such event where the speakers would be allotted much more time to go deeper in each subject. He also hinted at another mega event for creating awareness, a school-level program with the small and medium business men and another program exclusively for manufacturers

and those who are concerned with the actual business practices. This event would also have consultants and various professionals from their respective fields brought together.

Albert shared that there are small and large scale business groups in the Christian community and it is of great importance to have consultants and experts for greening business practices or assisting in eco-efficient business practices. Priyadarshini suggested that while she had been doing green audits for institutions, with the help of Deepika and Keerthi she would consider developing green audits for smaller industries as well. Fr. Allwyn shared that the booklet on carbon fasting needed to be more comprehensive, covering the various aspects of different kinds of celebrations wherein we can work to conserve environment; and suggested to modifying the booklet so that it covers the whole spectrum of programs, celebrations and functions and how eco-friendly practices could be incorporated.

B. Concluding Session at the 2017 Conference

The Asian Christian Business Groups representatives expressed views for future collaboration. Some participants were more interested in generating awareness by reaching out to small groups such as NGOs, individuals, parishes and communities through networking with those engaged in green initiatives, by creating training modules for parishes communities to spread Pope Francis' teaching on environment and his vision of creating a sustainable business and in turn, a sustainable world. Going forward with action, suggestions were to:

- Set ecologically motivating principles and ethics for business people integrated in business models
- In the spirit of this process, FABC to start carbon audit with its own offices and encourage other organisations to follow its footsteps
- Having been exposed to *Laudato Si'* at this conference, business people can now decide how much to follow the guidelines of the Church
- To influence other church member organisations like Caritas Asia or Caritas International; it is also an invitation to FABC and other participants to attend the Caritas Asia event about climate adaptation

- Business persons can use their positions to help the FABC in its endeavour in their respective countries
- All the participants individually expressed their gratitude for having been given the opportunity to come and be part of such an event. Some of the participants were amazed that such topics could also be highlighted for strategy building to combat climate change.

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137. The Contemporary Challenges in Living Priestly Celibacy in the Context of the Present Day Crisis in the Church in Asia, Edited by Fr. Lawrence Pinto, MSIJ, FABC Office of Clergy
138. "FABC at Forty Years: Responding to the Challenges of Asia", X FABC Plenary Assembly, December 2013
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