

# Lex Terra

ISSN : 2455-0965

Issue 20

01.07.16

## Articles

INDIA-USA SOLAR DISPUTE:  
WTO, CLIMATE CHANGE AND  
SUSTAINABLE DEVELOPMENT-  
*LAKSHMI DWIVEDI*

NEED AND IMPORTANCE OF  
ENVIRONMENTAL LAW IN  
INDIA—*ABDUL QADIR J.A.*

COMMENT ON WORLD CUL-  
TURAL FESTIVAL ALONG YA-  
MUNA RIVER IN DELHI IN  
MARCH 2016 —*JURI GOSWAMI*

PROTECTION OF LEGAL  
RIGHTS OF TRIBAL PEOPLE &  
WILDLIFE CONSERVATION-  
*DR.SUJATA SHRIVATAVA*

THE ISSUES OF TRANSGENIC  
CROPS AND BIOSAFETY IN  
INDIA-*DR. SUBIR KUMAR ROY*

OCEAN ACIDIFICATION: A  
DANGER YET *UNCOVERED-*  
*MONMI GOHAIN*

THE DIGITAL AGE AND 'E-  
WASTE CRISES' IN INDIA -  
*MINAKSHI GOSWAMI*



**NLU**

**CENTRE FOR ENVIRONMENTAL LAW, ADVOCACY AND RESEARCH**

**INDIA-USA SOLAR DISPUTE:  
WTO, CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT**

**Lakshmi Dwivedi\***

**INTRODUCTION**

---

With the heat of Climate Change being faced by the world over, a common but differentiated responsibility is being cast upon different countries to reduce the greenhouse emissions.<sup>1</sup> However, due to shortsightedness of human mind, the social benefits of deploying green house gas reducing mechanisms is not reflected in the costs, making them economically unviable.<sup>2</sup> The cost of producing renewable energy (manufacturing instruments) is generally higher than that of fossil fuels.<sup>3</sup> Thus, comes the need for government intervention to develop a green industrial policy making green economy socially and economically desirable.<sup>4</sup>

Green economy has been defined as “low carbon, resource efficient and socially inclusive. In practice, the sectoral scope is focused primarily on four sectors: renewable energy (e.g. solar, wind, geothermal), green building and energy efficiency technology, energy-efficient infrastructure and transportation, and recycling/waste-to-

---

\* Vth Year student, B.A. L.L.B, NALSAR University of Law, Hyderabad.

<sup>1</sup> *United Nations Framework Convention on Climate Change*, done at New York, 9 May 1992, 1771 UNTS 107; S. Treaty Doc No. 102-38; U.N. Doc. A/AC.237/18 (Part II)/Add.1; 31 ILM 849 (1992) (Henceforth, "UNFCCC").

<sup>2</sup> Joanna I. Lewis, *The Rise of Renewable Energy Protectionism: Emerging Trade Conflicts and Implications for Low Carbon Development*, 14 GLOBAL ENVIRONMENTAL POLITICS 4, pp. 11, 11/2013, available at [https://blogs.commonsgorgetown.edu/jil9/files/2014/01/Lewis.RE\\_Intl\\_Trade\\_Draft\\_11.2013.pdf](https://blogs.commonsgorgetown.edu/jil9/files/2014/01/Lewis.RE_Intl_Trade_Draft_11.2013.pdf) (last seen 30/4/2016) (Henceforth, ‘Lewis’)

<sup>3</sup> M.J., *Why is Renewable Energy so expensive*, ECONOMIST, 5/1/2014, available at <http://www.economist.com/blogs/economist-explains/2014/01/economist-explains-0> (last seen 30/4/2016).

<sup>4</sup> LEWIS, *supra* note 2.

energy.”<sup>5</sup> Government intervention in green energy is aimed at making it sustainable at the local and national level. A sustainable national green industrial policy is reflective of the concept of sustainable development as it integrates environment protection, economic growth and human development, by providing energy without increasing the carbon footprint, and creates a vibrant renewable energy sector, providing ‘green’ jobs and scope for research and development in this field.

To make green economy sustainable at the national level, a number of countries are deploying policies to encourage the same by incentivizing the sector and shielding the nascent industry from foreign competition.<sup>6</sup> This is in the form of ‘green subsidies’ and adopting ‘local content requirements’<sup>7</sup>. “Local content requirements are policy measures that require foreign or domestic investors to source a certain percentage of intermediate goods from local manufacturers or producers. These local producers can be either domestic firms or localized foreign- owned enterprises.”<sup>8</sup> In the renewable energy sector, this translates to mandatory LCRs condition for procurement of energy by the government, or government funds for research and development in this field.<sup>9</sup>

India used such LCRs for promoting solar energy. The Jawaharlal Nehru Solar Mission (JNSM) mandated LCRs for entering into a power purchase agreement with the government, for long-term electricity tariffs, and favorable low interest

---

5 Trade Environment, Climate Change and Sustainable Development Branch, UNCTAD, *Local Content Requirements and the Green Economy*, UNCTAD, 2014, available at <http://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=1090> (last seen 30/4/2016).

6 Virginia R. Hildreth, *Renewable Energy Subsidies and the GATT*, 14 CHI. J. INT’L L. 702, 705 2013-2014.

7 Henceforth, ‘LCR’

8 Jan-Christoph Kuntze and Tom Moerenhout, *Local Content Requirements and the Renewable Energy Industry - A Good Match?*, INTERNATIONAL CENTRE FOR TRADE AND SUSTAINABLE DEVELOPMENT, 2013, available at <http://www.ictsd.org/themes/climate-and-energy/research/local-content-requirements-and-the-renewable-energy-industry-a> (last seen 30/04/2016) (henceforth, ‘Kuntze’)

9 *Ibid.*

financing.<sup>10</sup> Canada, USA, Europe and China had also implemented similar policies to develop local renewable energy sector models in the country.<sup>11</sup> However, such policies have faced the hostility of the International Trade Regime wherein WTO has held that such LCRs are in violation of the International Trade obligations.<sup>12</sup> USA, and China have bilaterally settled the issue<sup>13</sup> but USA brought a case against India in WTO for use of such LCRs and subsequently won.<sup>14</sup> Similarly, Canada lost to Japan, who had challenged its LCRs.<sup>15</sup>

Thus, at the intersection between Environment and International Trade, one can witness the tension between these two, as reflected in the disputes. This paper attempts to analyze the same. The paper is divided into five parts. Part I deals with the feasibility of subsidies and LCRs in combating climate change; Part II with the International regime that affects the energy sector; Part III with the India-US Solar

---

10 Ministry of New and Renewable Energy, *Jawaharlal Nehru National Solar Mission Phase II – Policy Document*, <http://mnre.gov.in/file-manager/UserFiles/draft-jnnsmpd-2.pdf> (last seen 30/4/2016) (Henceforth, ‘India-policy’)

11 Marie Wilke, *Feed-in Tariffs for Renewable Energy and WTO Subsidy Rules An Initial Legal Review*, INTERNATIONAL CENTRE FOR TRADE AND SUSTAINABLE DEVELOPMENT, available at <http://www.ictsd.org/downloads/2011/11/feed-in-tariffs-for-renewable-energy-and-wto-subsidy-rules.pdf> (last seen 30/04/2016) (Henceforth, ‘Wilke’).

12 *Ibid.*

13 *China — Measures concerning wind power equipment*, Dispute DS419, 22/12/2010, available at [https://www.wto.org/english/tratop\\_e/dispu\\_e/cases\\_e/ds419\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds419_e.htm) (last seen 30/04/2016).

14 Panel Report, *India — Certain Measures Relating to Solar Cells and Solar Modules*, WT/DS456/R, 24/02/2016, available at [https://docs.wto.org/dol2fe/Pages/FE\\_Search/FE\\_S\\_S006.aspx?Query=\(@Symbol=%20wt/ds456/r\\*%20not%20rw\\*\)&Language=ENGLISH&Context=FomerScriptedSearch&languageUIChanged=true#](https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S006.aspx?Query=(@Symbol=%20wt/ds456/r*%20not%20rw*)&Language=ENGLISH&Context=FomerScriptedSearch&languageUIChanged=true#) (last seen 30/04/2016) (henceforth, ‘India-Solar’)

15 Appellate Body Report, *Canada — Measures Relating to the Feed-in Tariff Program*, WT/DS412/AB/R; WT/DS426/AB/R, available at [https://docs.wto.org/dol2fe/Pages/FE\\_Search/FE\\_S\\_S006.aspx?Query=\(@Symbol=%20wt/ds426/ab/r\\*%20not%20rw\\*\)&Language=ENGLISH&Context=FomerScriptedSearch&languageUIChanged=true#](https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S006.aspx?Query=(@Symbol=%20wt/ds426/ab/r*%20not%20rw*)&Language=ENGLISH&Context=FomerScriptedSearch&languageUIChanged=true#) (last seen 30/04/2016) (Henceforth, ‘Canada-FITs’).

dispute; Part IV with tension between such climate change policies and International Trade Law; Part V concludes with possible solutions to deal with the conflict.

## GREEN PROTECTIONISM: SWEETENING THE PILL

---

Traditional sources of energy have been detrimental to our environment including the health of individuals, with the poor being the worst hit by environmental degradation.<sup>16</sup> The UNFCCC and the Kyoto Protocol further require reducing our green house emissions.<sup>17</sup> Thus, green energy is the need of the hour. UN has espoused sustainable energy as consisting of the following: Universal access to modern energy services; Double the global rate of improvement in energy efficiency; the share of renewable energy in the global energy mix.<sup>18</sup>

To counter the higher costs of providing such energy at the outset and to create a demand, the government has been deploying a number of strategies. Canada had used Feed-in Tariffs as a policy tool, which guaranteed purchase of electricity by the Ontario Government but also imposed LCRs as a precondition.<sup>19</sup> Similar is the situation in India.<sup>20</sup> Do LCRs really help in achieving the avowed goal of promoting green technology?

### Arguments for LCRs.

The first argument in support of LCRs is that it helps in transfer of technology to developing countries, since established industries try to set up shop in the local market and reap the benefits of LCRs.<sup>21</sup> India has allowed 100% FDI in this sector.<sup>22</sup>

---

16 KUNTZE, *supra* note 8 at 12.

17 *Ibid.*

18 --, *Sustainable Energy For All: An Overview*, UNITED NATIONS, available at <http://www.un.org/millenniumgoals/pdf/SEFA.pdf> (last seen 30/04/2016).

19 WILKE, *supra* note 11 at 21.

20 *Ibid* at 26.

21 KUNTZE, *supra* note 8 at 3.

22 See *FDI Policy: Renewable Energy*, MAKE IN INDIA, available at <http://www.makeinindia.com/sector/renewable-energy> (last seen 30/04/2016).

Second, such incentives increase public support for renewable energy by spurring domestic innovation and creating ‘green jobs’.<sup>23</sup> The success of such a program is evident in Canada, which had been successful in creating new jobs, encouraging innovation and reducing carbon footprint.<sup>24</sup> Compliance with climate change regulations are costly, hence these measures, ‘sweeten the pill’.<sup>25</sup> “The recent economic crisis has led many governments to invest large sums of money in domestic industry to revitalise their economies. These investments are often made as green stimulus packages, which are usually aimed at promoting local environmental friendly industry, and thereby supporting both environmental and domestic economic goals. While it is encouraging to see that public resources are being dedicated to the promotion of environmental goods, it is doubtful that these heavy investments would have been made if it was not for the economic benefits achieved by them for domestic economies.”<sup>26</sup> This is evident by how Ontario government in Canada decided to cut down its purchase of power from solar industry, after its LCR requirements were held to be in violation of its international trade obligations.<sup>27</sup>

Third, it offsets the entry costs for infant industries by protecting them for a certain period until they can compete in the international market on their own, thus creating level playing field in the international market.<sup>28</sup> This has long-term benefits since more competitors in the international market would translate to a more

---

23 Sherry M. Stephenson, *Addressing local content requirements: Current challenges and future opportunities*, 7 *BIORES* 3, 25/07/2013, available at <http://www.ictsd.org/bridges-news/biores/news/addressing-local-content-requirements-current-challenges-and-future> (last seen 30/04/2016) (Henceforth, ‘Stephenson’)

24 WILKE, *supra* note at 21.

25 Avidan Kent, *The WTO Law On Subsidies And Climate Change: Overcoming The Dissonance?*, 5 *TRADE L. & DEV.*, p. 344, p. 380, 2013. (henceforth, ‘Avidan’)

26 *Ibid*

27 *Id.*

28 STEPHENSON, *supra* note 23.

competitive green economy, stimulating efficiency and innovation in cost effective technology.<sup>29</sup>

### **Arguments against LCRs.**

It has been argued by some that using LCRs works against the protection of environment in the long run. LCRs force investment in costly local products compared to cheaper imported products, thus increasing the cost of production.<sup>30</sup> The proponents have argued that short term LCRs will in the medium and long run result in competition and innovation, lowering the costs.<sup>31</sup>

However, the opponents argue that once LCRs are implemented, fierce opposition would meet withdrawal by government.<sup>32</sup> They might become dependent on government support and might find it difficult to function with it.<sup>33</sup> Thus, it is claimed that LCRs and green subsidies would amount to green protectionism, which must be discouraged, since liberalization of trade can result in efficient trading and cheaper technology, leading to the benefit of the environment.<sup>34</sup>

### **Best LCR Practices.**

The advantages that LCRs provide can't be ignored. To assuage the fears of the opponents, the following practices can be adopted. The first is that it must be temporary and must be phased out.<sup>35</sup> It can't be treated as a panacea for all climate

---

<sup>29</sup> *Ibid.*

<sup>30</sup> Gwyn Morgan, *The sorry lessons of green-power subsidies*, THE GLOBE AND MAIL, 29/04/2012, available at <http://www.theglobeandmail.com/report-on-business/rob-commentary/the-sorry-lessons-of-green-power-subsidies/article4103467/> (last seen 30/04/2016).

<sup>31</sup> STEPHENSON, *supra* note 23

<sup>32</sup> *Ibid.*

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

<sup>35</sup> KUNTZE, *supra* note 8 at 11.

change issues.<sup>36</sup> Second, there must be focus on capacity building and not just mere ownership. It should encourage the ‘learning-by-doing potential’ by not merely focusing on manufacturing, but also on training capacity, by encouraging the transfer of technology.<sup>37</sup>

Third, the LCRs requirement should set realistic targets and shouldn't be set too high, otherwise it shall become counter-productive and costly.<sup>38</sup> Attempt must be made to provide such products under LCRs at competitive prices.<sup>39</sup> Finally, an open and transparent policy is needed. LCRs must be accompanied by investment incentives.<sup>40</sup> “In addition to or in the alternative, investors are required to meet certain performance requirements such as employment, technology transfer, research and development, domestic ownership in order to enjoy the investment incentive. Investment incentives vary from country to country, they may relate to financial assistance, tax credits, bonus payments or eligibility to qualify for a procurement process.”<sup>41</sup>

Thus, green subsidies contingent on LCRs with some riders, are in consonance with the idea of sustainable development. The Bruntland Committee in its report has laid down the procedural goals for achieving sustainable development as empowerment, consultation, expansion of opportunities and capacities and public

---

<sup>36</sup> *Ibid* at 17.

<sup>37</sup> *Id* at 11.

<sup>38</sup> Timothy Meyer, *Local Discrimination and Global Public Goods*, 95 BOSTON UNIVERSITY LAW REVIEW 1939,p.60, 2015, available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2674261](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2674261) (last seen 30/04/2016).

<sup>39</sup> *Ibid*.

<sup>40</sup> Edith Kiragu, *Transition Into A Green Economy: Are There Limits To Government Intervention?*, WORLD TRADE INSTITUTE WORKING PAPER NO. 05/2015, p.16, 11/2015, available at [http://www.wti.org/media/filer\\_public/5b/dd/5bddb3d9-5ed8-448a-8d38-ff3325c4cd97/wti\\_seco\\_wp\\_05\\_2015.pdf](http://www.wti.org/media/filer_public/5b/dd/5bddb3d9-5ed8-448a-8d38-ff3325c4cd97/wti_seco_wp_05_2015.pdf) (last seen 30/04/2016) (Henceforth, ‘Kiragu’)

<sup>41</sup> *Ibid*.

participation<sup>42</sup> and LCRs do the same. It empowers the local industries by reducing their entry costs and creates green jobs, expanding opportunities.<sup>43</sup> By incentivizing local research, it also builds the capacities of the country and increase public participation.<sup>44</sup> Thus, one can deduce that the sustainable development fosters self-reliance by any country. Over-reliance on imports and not developing an independent infant domestic renewable energy market is not a part of sustainable development. LCRs do help in achieving all of these by aiding the domestic industries, creating ‘green jobs’ and incentivizing transfer of technology.

---

42 *Report of the World Commission on Environment and Development: Our Common Future*, available at <http://www.un-documents.net/wced-ocf.htm> (last seen 30/04/2016) (Henceforth, ‘The Report’)

43 KIRAGU, *supra* note 40 at 8.

44 *Ibid.*

## GOVERNANCE OF SUSTAINABLE ENERGY

The governance model of sustainable energy has not been comprehensive and has been described as fragmented.<sup>45</sup> There exist some bilateral/ multilateral treaties aimed at encouraging clean energy such as US-Mexico Bilateral Framework on Clean Energy and Climate Change or the Australia-EU Partnership Framework.<sup>46</sup> Energy Charter Treaty (ECT) is another agreement that governs investment trade aspects between governing states.<sup>47</sup> Further, UNFCCC and Kyoto Protocol propound cutting down emissions, but the policy framework for the same has been left to individual states.<sup>48</sup> However, the major implication on energy sector is by the WTO framework. WTO governs international trade and hence covers trade in energy by default since the intersection between energy and climate change gives rise numerous trade issues, such as clean energy subsidies, carbon taxes etc.<sup>49</sup>

It has been stated that such governance arises by default and is ‘accidental’, not by design.<sup>50</sup> “This patchwork of institutions and regimes amounts to a sort of "accidental" energy trade governance, and presents some areas of overlap. For instance, both the WTO and the ECT have rules that apply to the trade, investment, and environmental- protection aspects of energy. These overlaps, however, in no way

---

45 Rafael Leal-Arcas & Andrew Filis, *The Fragmented Governance of the Global Economy: A Legal-Institutional Analysis*, 6 J. WORLD ENERGY L. & BUS. 4, p.1, 2013. (Henceforth, ‘Arcas’)

46 Joachim Monkelbaan, *Climate Change & Trade: Oportunities For Cooperative Action*, INTERNATIONAL CENTER FOR TRADE AND SUSTAINABLE DEVELOPMENT, available at [https://unfccc.int/files/cooperation\\_support/response\\_measures/application/pdf/ppt\\_2013\\_unfccc\\_rm\\_cooperation\\_final\\_ictsd.pdf](https://unfccc.int/files/cooperation_support/response_measures/application/pdf/ppt_2013_unfccc_rm_cooperation_final_ictsd.pdf) (last seen 30/04/2016).

47 *Ibid.*

48 *Id.*

49 ARCAS, *supra* note 45 at 3.

50 Rafael Leal-Arcas, *Trade Proposals for Cimate Action*, 6 TRADE L. & DEV. 4, p.16, 2014. (Henceforth, ‘Rafael’)

amount to cohesive governance of energy trade.”<sup>51</sup> The focus of this research is on clean energy subsidies.

WTO’s International Trade regime that affects climate change policies are largely the non-discrimination obligation, the exceptions to this obligation as enumerated in the General Agreement on Trade and Tariff (GATT), the agreement on Subsidies and Countervailing Measures (SCM) and the agreement on Trade Related Investment Measures (TRIMS). The preamble of the Marrakesh Agreement establishing the World Trade Organisation refers to the objective of sustainable development to further the protection of environment. Thus, it must guide the interpretation of WTO agreements.<sup>52</sup>

### **Non-Discrimination Obligation.**

This is enumerated in the GATT<sup>53</sup> and TRIMS agreement.<sup>54</sup> Non-discrimination obligation is of two categories. One bars countries from discriminating their national products against the imported products as is called as the ‘National Treatment Obligation’.<sup>55</sup> The second bars discrimination between products of different countries and is called as the ‘Most Favored Nation’ obligation.<sup>56</sup> The National Treatment obligation hits the LCRs since they essentially involve favoring domestic products over the foreign one.<sup>57</sup>

### **Subsidies and Countervailing Measures Agreement**

---

<sup>51</sup> *Ibid.*

<sup>52</sup> *Vienna Convention on the Law of Treaties*, Article 31, Done at Vienna, 23 May 1969, 1155 UNTS 331; 8 International Legal Materials 679,

<sup>53</sup> *General Agreement on Tariffs and Trade*, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194

<sup>54</sup> *Agreement on Trade-Related Investment Measures* , Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, 1868 U.N.T.S. 186 (henceforth, ‘ TRIMS Agreement’).

<sup>55</sup> TRIMS AGREEMENT,*supra* note 54 at Article 2.; GATT, *supra* note 53 at Article III:2.

<sup>56</sup> GATT, *supra* note 53 at Article I.

<sup>57</sup> WILKE, *supra* note 11 at 1.

Subsidies have been defined under the agreement as comprising of these requirements: “(i) a financial contribution (ii) by a government or any public body within the territory of a Member (iii) which confers a benefit.”<sup>58</sup> All three of these elements must be satisfied in order for a subsidy to exist.<sup>59</sup> The agreement has divided subsidies into types i.e. prohibited and actionable subsidies.<sup>60</sup> Prohibited subsidies include those which are conditional on LCRs.<sup>61</sup> Subsidies categorized as actionable are not per se prohibited, however they can be legally challenged in case they cause adverse effects to other members’ interests.<sup>62</sup>

It has been held that such government assistance to renewable energies, which is conditioned on LCR is prohibited under the SCM agreement.<sup>63</sup>

### **Defences**

The most prominent defense employed against the non-discrimination obligation is Article XX(a) of GATT which lays down that allows discriminatory measures which are “necessary to protect human, animal or plant life or health”.<sup>64</sup> It has been held by the adjudicatory body under WTO that the article encompasses measures to preserve ‘clean air’ as necessary to protect human, plant life and animal

---

58 *Agreement on Subsidies and Countervailing Measures*, Article 1.1(a), April 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, 1869 U.N.T.S. 14 [henceforth, ‘SCM Agreement’]

59 --, *Subsidies And Countervailing Measures: Overview*, WORLD TRADE ORGANIZATION, available at [https://www.wto.org/english/tratop\\_e/scm\\_e/subs\\_e.htm](https://www.wto.org/english/tratop_e/scm_e/subs_e.htm) (last seen 30/04/2016).

60 *Ibid.*

61 SCM AGREEMENT, *supra* note 58 at Article 3.1(b).

62 *supra* note 54.

63 CANADA-FITs, *supra* note 15.

64 GATT, *supra* note 53 at Article XX(b).

health.<sup>65</sup> Further, it has been held that measures need not show immediate effect and can be observed in the long-term.<sup>66</sup>

However, Article XX(b) also requires that such a measure shouldn't constitute "arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade."<sup>67</sup> Green subsidies with LCR won't be able to meet the requirement since the exception covers only principle of environment protection but not sustainable development as a whole. LCRs are needed to develop national renewable energy sector but it can be argued that LCRs are needed for sovereign benefits and not for global environment protection.<sup>68</sup> In fact, it can be held by the adjudicatory panel that LCRs impede protection of environment, as propounded by the opponents of LCRs. Even though support schemes might be covered under this exception, however LCRs can be argued to constitute disguised restriction on trade.<sup>69</sup> It is maybe, for the same reason, that both Canada and India didn't go under this route and chose technical defenses such as government procurement.

Further, the SCM Agreement treats all subsidies as bad per se and has no exceptions. Some have argued that GATT Article XX exceptions can be imported into SCM, since WTO has a comprehensive framework and GATT is a general agreement,

---

65 Panel Report, United States-Standards for Reformulated and Conventional Gasoline, WT/DS2/R; Appellate Body Report, United States-Standards for Reformulated and Conventional Gasoline, WT/DS2/AB/R.

66 Appellate Body Report, *Brazil-Measures Affecting Imports of Retreaded Tyres*, ¶¶119, 129, WT/DS332/AB/R

67 *supra* note 54.

68 RAFAEL, *supra* note 15.

69 AVIDAN, *supra* note 25.

which governs the principles of other special agreements such as SCM.<sup>70</sup> However, the adjudicatory body has rejected such argument.<sup>71</sup>

### **Dispute Resolution under WTO**

Any member country can complain to the WTO dispute settlement process, which involves consultation and mediation. Failure at that stage can lead to dispute settlement by a Panel, whose decision can be appealed in the Appellate Body. If a country's actions are found to be violative of the International Trade obligations, then they would be given a reasonable time to comply with the obligations by amending or removing the WTO inconsistent measures. If there is no compliance within reasonable time frame, the complainant can ask for compensation or retaliatory trade measure.

Under this framework, cases against India and Canada were brought. The dispute with China's similar policy for wind energy was settled bilaterally at the consultation stage. In the case of *Canada- Feed-in Tariff*, the Appellate Body held their LCR policy as inconsistent of GATT and SCM Agreement.<sup>72</sup> Canada has agreed to comply with the ruling.<sup>73</sup> Similarly, India's solar policy has been challenged by USA in the case of *India- Solar*, the panel has ruled in favor of USA. India shall be appealing to the Appellate Body against this decision.<sup>74</sup> The next section shall deal with this case.

---

70 Kenina Lee, *An Inherent Conflict Between WTO Law and a Sustainable Future? Evaluating the Consistency of Canadian and Chinese Renewable Energy Policies with WTO Trade Law*, 24 GEO. INT'L ENVTL. L. REV. 57, p.89, 2011-2012,

71 Panel report *China-Measures related to the Exportation of Various Raw Materials* , WT/DS394/P/R; WT/DS395/P/R; WT/DS398/P/R.

72 CANADA-FITs, *supra* note 15.

73 --, *Canada — Measures Relating to the Feed-in Tariff Program*, WORLD TRADE ORGANIZATION, available at [https://www.wto.org/english/tratop\\_e/dispu\\_e/cases\\_e/ds426\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds426_e.htm) (last seen 30/4/2016).

74 --, *India — Certain Measures Relating to Solar Cells and Solar Modules*, WORLD TRADE ORGANIZATION, available at [https://www.wto.org/english/tratop\\_e/dispu\\_e/cases\\_e/ds456\\_e.htm](https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds456_e.htm) (last seen 30/4/2016).

## THE INDIA-USA SOLAR DISPUTE

---

As mentioned previously, this dispute essentially involved India's solar policy as enumerated in the Jawaharlal Nehru Solar Mission (JNSM). In Phase I, the LCR exempted usage of thin film solar PV panels.<sup>75</sup> Even though Phase I was questioned by USA, it kept quiet.<sup>76</sup> However, when under Phase II, when LCRs were mandated even for the thin film solar PV panels, USA was irked and it decided to start proceedings under WTO since it was one of the major manufacturer of these films.<sup>77</sup>

The Panel held that that such policy is a violation of India's non-discrimination obligations under GATT and TRIMS.<sup>78</sup> To defend itself, India argued that it is covered by Article XX(j) which exempted measures which are, "essential to the acquisition or distribution of products in general or local short supply."<sup>79</sup> However, the Panel held that such solar policy is not essential to distribution since it is not in short supply.<sup>80</sup>

It is notable that India didn't try to defend its action under Article XX(b) which talks of measures necessary to preserve human, plant life or animal health. Instead, it took the root under Article XX(d) which deals with measures which are "necessary to secure compliance with laws or regulations which are not inconsistent with the provisions of this Agreement".<sup>81</sup> To this extent, India mentions the UNFCCC

---

<sup>75</sup> INDIA-POLICY, *supra* note 10.

<sup>76</sup> Jeremy Borgia, *US Complaint: India – Certain Measures Relating To Solar Cells And Solar Modules*, available at <http://jborgia.midcreate.net/wp-content/uploads/2016/01/US-India-WTO-Solar.pdf> (last seen 30/04/2016).

<sup>77</sup> *Ibid.*

<sup>78</sup> INDIA-SOLAR, *supra* note 14.

<sup>79</sup> *Ibid.*

<sup>80</sup> *Id.*

<sup>81</sup> GATT, *supra* note 53 at Article XX(d)

framework and principles of sustainable development as espoused in Rio Principles and its subsequent developments.<sup>82</sup> It also talked of national measures to promote socio-economic development.<sup>83</sup> However, the Panel didn't attend the question as to whether the measures further sustainable development. It, on a technical argument, decided that Article XX(d) requires compliance with domestic laws or with international principles which have a direct effect on domestic laws.<sup>84</sup>

As evident from the case, the principle of sustainable development didn't guide the interpretation of any provision. Technicalities ruled the roost and the question of application of such principles was shut down on the grounds that it doesn't form part of laws and regulations, which require compliance with. The next section shall deal with this precise tension between International Trade and green subsidies to combat climate change.

---

82 Id.

83 Id.

84 Id.

### **Liberalization is not the solution**

Liberalization of trade, the International Trade foremost principle can indeed help promulgate climate change policies. If tariff and non-tariff barriers are removed in the trade of environmental goods, it shall reduce cost and increase supply of renewable energy.<sup>85</sup> The efforts to do the same are evinced in the 2001 Doha Ministerial Declaration, which aims at pursuing negotiations to eliminate tariffs on climate friendly environmental goods and services.<sup>86</sup>

It has been argued that liberalization “will help energy-producing countries to find newer markets and help energy-consuming countries to find cross-border resources, thus creating greater energy efficiency, interdependence and stability.”<sup>87</sup> Thus, it is believed that trade can be the influential mechanism to push climate agenda efficiently.<sup>88</sup> But for this, it is important to focus on “global sustainable development” and on not sovereign economic growth.<sup>89</sup>

However, liberalization might not be the cure for climate change policies due to the following reasons. Sustainable development requires a balanced consideration between environment protection and socio-economic interests.<sup>90</sup> Liberalization can be a tool for existing companies to access new markets.<sup>91</sup> Thus, emerging markets of renewable energy must have a policy space, probably in Doha negotiations to incorporate the principle of Common but Differentiated Responsibility to seek

---

85 RAFAEL, *supra* note 15.

86 --, *The Doha Declaration Explained*, WORLD TRADE ORGANIZATION, available at [https://www.wto.org/english/tratop\\_e/dda\\_e/dohaexplained\\_e.htm](https://www.wto.org/english/tratop_e/dda_e/dohaexplained_e.htm) (last seen 30/04/2016).

87 LEWIS, *supra* note 2 at 20.

88 RAFAEL, *supra* note 15.

89 *Ibid.*

90 THE REPORT, *supra* note 42.

91 KIRAGU, *supra* note 41.

exemptions for using LCRs since their infant industries wont be able to bear the entry costs and would be unable to compete.<sup>92</sup>

Further, there is an element of the ‘tragedy of the commons’ involved when dealing with climate change policy. Atmosphere is the ‘commons’ of the world and no one has any incentive to alter current behavior, which has resulted in over-exploitation and probably would lead to exhaustion.<sup>93</sup> Thus, one way to remedy is to adopt ‘bottoms up’ approach that is measures that come from people increasing and encouraging their participation and giving them benefits that are proportionate to their costs.<sup>94</sup> Thus, “political commitments for climate change efforts in this respect, may come only once the advantages for domestic economies have been secured. A level of ‘unfair’ competition therefore, seems to be inevitable in order to convince governments to act, especially in light of the weak prospect for significant multilateral action.”<sup>95</sup> Thus, it strengthens the political will to adapt such schemes.

Even economics can justify usage of such subsidies, which are in conflict with liberalization. International Trade treats all subsidies as bad, except agricultural subsidies. Such treatment is oblivious of the economic situation and those in certain situations subsidies don’t confer a ‘benefit’ but help in reducing the entry costs and hence help create a market for goods and services that might not have survived in a

---

<sup>92</sup> *Ibid.*

<sup>93</sup> Livemint, Climate change and the tragedy of the commons: The absence of clear liability rules allows polluters to unload costs of their action onto third parties, LIVE MINT, 21/04/2014, available at <http://www.livemint.com/Opinion/RBhYOrWoYrTn3eHpWja6CP/Climate-change-and-the-tragedy-of-the-commons.html> (last seen 30/04/2016).

<sup>94</sup> Jouni Paavola, *Climate change: the ultimate ‘tragedy of the commons’?*, SUSTAINABILITY RESEARCH INSTITUTE PAPER NO. 24; CENTRE FOR CLIMATE CHANGE ECONOMICS AND POLICY WORKING PAPER NO. 53, 2011, available at [http://www.see.leeds.ac.uk/fileadmin/Documents/research/sri/workingpapers/SRIPs-24\\_01.pdf](http://www.see.leeds.ac.uk/fileadmin/Documents/research/sri/workingpapers/SRIPs-24_01.pdf) (last seen 30/04/2016).

<sup>95</sup> AVIDAN, *supra* note 25 at p.36.

free market condition.<sup>96</sup> However, it must be conditional, on factors mentioned above<sup>97</sup> to make it efficient.

### **Will WTO accord place to climate change subsidies?**

Development of WTO policies has been in isolation with other parallel fields<sup>98</sup> such as climate change. GATT treats trade in all sectors alike and hence doesn't distinguish between climate change policies and others, which might need differential treatment.<sup>99</sup> This is evident by how the Director-General of WTO, Pascal Lamy has announced that the issue of climate change must not be discussed in the WTO, until a global consensus is arrived.<sup>100</sup> Thus, self contained and autonomous regime of WTO, have been unable to incorporate a balancing test, which would give accord to the differential requirements of climate change policies, even though it would support sustainable development, as long as the trade obligations are not hurt.<sup>101</sup>

This is manifested even by the Panel decision in *India-Solar Dispute* case, wherein a prima facie violation of an International Trade obligation, rendered the policy invalid, without going into the question of whether it promotes sustainable development.<sup>102</sup> Such a prima facie violation eliminates any environmental policy.<sup>103</sup> The lack of a balancing element is evinced in the framework of GATT and SCM Agreements.

---

<sup>96</sup> *Ibid* at p. 37.

<sup>97</sup> See Part I; Best LCR Practices.

<sup>98</sup> Joost Pauwelyn, Bridging Fragmentation And Unity: International Law As A Universe Of Inter-Connected Islands, 25 MICH. J. INT'L L.,4, p. 903, 2004.

<sup>99</sup> AVIDAN, *supra* note 25 at p.6.

<sup>100</sup> Emily Barrett Lydgate, *Sustainable development in the WTO: from mutual supportiveness to balancing*, 11 WORLD TRADE REVIEW 4, p. 621, 2012 available at [http://journals.cambridge.org/abstract\\_S1474745612000341](http://journals.cambridge.org/abstract_S1474745612000341) (last seen 30/04/2016) (Henceforth, 'Emily')

<sup>101</sup> *Ibid*.

<sup>102</sup> INDIA-SOLAR, *supra* note 14.

<sup>103</sup> Emily, *supra* note 100.

Sustainable Development, as an idea, is reflected in the preamble of the Marrakesh Agreement establishing WTO, as one of the objectives to be attained however, it hasn't been guiding the interpretation of either the GATT or SCM, as reflected in *Canada-Feed in Tariffs* and *India-solar dispute* case.<sup>104</sup>

The GATT exception under Article XX, as pointed above, defer to non-discrimination, which is not compatible with a 'bottoms up' approach. Further, the SCM agreement is treating all subsidies as illegal.<sup>105</sup> It did have a clause on 'non-actionable' subsidies, which included "subsidies granted for research activity (including research activity conducted by private firms) and assistance to firms' adaptation efforts to new environmental requirements imposed by regulation."<sup>106</sup> However, the same clause has expired in 1999 and wasn't extended.

#### **WTO conflicts with environment: Old v. New**

Conflicts of WTO with Environment have are not new. However, the nature of these conflicts has changed over the years. The old conflicts dealt with developed countries imposing measures to improve the environmental behavior of developing trading countries.<sup>107</sup> For example, in the case of *United States-Restrictions on Imports of Tuna*<sup>108</sup>, the measure banned import of products, which used certain type of a net to capture tuna that would also harm dolphins. Developing countries complained this as an unjustifiable breach of the International Trade obligations.<sup>109</sup> Though, initially trade principle conquered, however due to increased protests by environmentalists, WTO interpreted Article XX(b) to accommodate environmental principles.<sup>110</sup> This

---

104 INDIA-SOLAR, *supra* note 14; CANADA-FITS, *supra* note 15.

105 WILKE, *supra* note 11 at 7.

106 *Supra* note 59.

107 Mark Wu & James Salzman, The Next Generation Of Trade And Environment Conflicts: The Rise Of Green Industrial Policy, 108 Nw. U. L. REV. 401, 2013-2014. (henceforth, 'Wu')

108 Panel Report, United States-Restrictions on Imports of Tuna, DS21/R

109 *Ibid.*

110 *Id.*

change was brought about in the case of *United States-Import Prohibition of Certain Shrimp and Shrimp Products*<sup>111</sup>, wherein import of shrimps were banned which used a method to capture shrimp that also drowned endangered turtles.<sup>112</sup>

However, the landscape of the conflict is changing with the conflict no longer being restricted to a global north v. south distinction.<sup>113</sup> Canada, Europe, USA, China, South Africa have all been at different sides of the debate on green subsidies. For example, certain USA states had incorporated LCR requirements. Similarly, Canada faced heat for its LCRs. Even certain members of EU have LCRs in place.

Secondly, the scope of laws governing the conflict is growing and it doesn't include an enforceable environmental principle.<sup>114</sup> Previously, GATT used to govern the disputes and involved recourse to Article XX exceptions. However, with the SCM agreement in place, no such recourse is permissible and there is no balancing aspect tilting towards sustainable development.<sup>115</sup> A violation of trade obligation is sufficient to render the environmental policy illegal.

However, the effect of such a judgment might be less severe today, with the offending obligation severable from broader environmental policy.<sup>116</sup> Thus, in the case of *Canada- Feed in Tariffs*, government procurement without LCRs was considered legitimate.<sup>117</sup> Thus, the policy could continue, however, it did have some practical effects and Ontario government cut down its purchase obligations with the

---

111 Appellate Body Report, *United States-Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R

112 *Ibid.*

113 WU, *supra* note 107.

114 *Ibid.*

115 *Id.*

116 *Id.*

117 *CANADIAN-FITS*, *supra* note 15.

new policy.<sup>118</sup> Another WTO policy that can be helpful is the one under the General Agreement on Trade in Services (GATS).<sup>119</sup> Not all elements of renewable energy sector involve manufacturing aspect i.e. trade in goods. Some of these also involve rendering services and under GATS, a country reserves the right to liberalize or not liberalize trade in a particular sector. <sup>120</sup>

---

118 The Canadian Press, *Ontario to cut rates paid for wind, solar power*, CANADIAN BROADCAST CORPORATION, TORONTO, 22/03/2012, available at <http://www.cbc.ca/news/canada/toronto/ontario-to-cut-rates-paid-for-wind-solar-power-1.1157717> (last seen 30/04/2016).

119 *General Agreement on Trade in Services*, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1B, 1869 U.N.T.S. 183.

120 *Ibid.*

## CONCLUSION: THE NEXT STEP

---

It has been noted how green subsidies are important for combating climate change, with some riders of course and how WTO might not give the requisite policy space to enact these measures. With climate change being an immediate threat, requiring action, other possible alternatives can be explored.

WTO has previously accommodated sector specific agreement, such as agreement on subsidies in agriculture, intellectual property etc.<sup>121</sup> Currently, a new agreement on trade in environmental goods and services is being debated.<sup>122</sup> As mentioned previously, the Doha Ministerial Declaration talks of the same. Though, it aims at liberalization of trade in environmental goods and services, however emerging markets can make use of the policy space provided to negotiate, seek exemption and justify their LCRs and green subsidies.<sup>123</sup> Further, under the SCM Agreement, the clause on non-actionable subsidies, which spoke of green subsidies can be renewed.<sup>124</sup>

However, negotiations can be prolonged and currently might not give climate change policy the priority it needs.<sup>125</sup> Thus, there is need for bilateral negotiations in this area. There can be a temporary peace clause between countries, during which countries promise to resolve the dispute bilaterally than take it to WTO Dispute Settlement Mechanism.<sup>126</sup> There is a need to balance free trade with apt climate change policies, which is currently lacking in the trade forum.

---

121 Paolo Davide FARAH & Elena Cima, *WTO and Renewable Energy: Lessons from the Case Law*, 49 JOURNAL OF WORLD TRADE 6, 2015, available at <http://ssrn.com/abstract=2704453> (last seen 30/04/2015).

122 *Ibid.*

123 KIRAGU, *supra* note 40.

124 *Ibid.*

125 STEPHENSON, *supra* note 23.

126 KIRAGU, *supra* note 40.



## **Need and Importance of Environmental Law in India**

Abdul Qadir J.A.

Student, Alliance School of Law,  
Bangalore.

*It is horrifying that we have to fight our own government to save the environment.*

-Ansel Adams

*Through ignorance and indifference we can do massive and irreversible harm to the earthly environment on which our life and wellbeing depend... To defend and improve the human environment for present and future generations has become an imperative goal for mankind- a goal to be perused together and in harmony with the established and fundamental goals of peace, and of worldwide economic and social development. In its original form, the Constitution of India contained no provision relating to protection of Environment. This is because at the time of framing the Constitution, the Environment consciousness was at its lowest ebb. The apex court in KM Chinnappa case opined on how the Constitutional set up is now attuned to commitment to the ideas of Environmental protection. This was justified in light of the technological and social transformation all over the world.*

Solving environmental problems, both local and global, constitutes one of the basic challenges for humanity. Solving these problems requires enhancing and deepening our knowledge of the environment on one hand, and recognizing mutual, man-environment interactions on the other. Solutions to numerous and diversified problems in the field of environmental protection may be achieved both through scientific research providing new information, and through knowledge already collected by different disciplines. Conservation and protection of the environment have been an inseparable part of Indian heritage and culture. Realizing its importance, the Indian State has also enshrined it in the Constitution which requires both the state and the citizen to “protect and improve the environment”. The liberalization and globalization of the economy makes it imperative that we increase our vigil

to ensure that industrial growth is not at the cost of the environment. Natural resources need to be protected and nurtured. Ancient civilizations self-destructed when they over-exploited their resource base.

In view of the enormous challenges thrown by the industrial revolution, the legislatures throughout the world are busy in making laws to preserve Mother Earth. Many have enacted laws long back and they are busy in remodelling the environmental laws. We live and work for a good life, good food, and good health. Polluted air and water, shortages of water and fuel do not come under any of these. In which case, is industrialization at the cost of our health and comfort sustainable? Subsequently, many new provisions have been provided by the Government of India and our law makers: the Green Benches, National Environmental Tribunals, Coastal Regulation Zone Notification, Ecomark, Biosafety Protocol, etc. Amendments have also been introduced diluting or strengthening these laws. The legislations that responded to these incidents, as well as the various other environmental statutes now in place, were all good faith efforts to respond to specific types of environmental abuse—pollution in the air and water, extinction of specific species of animals, clear cutting of national forests, toxic chemicals dumped in pits and covered over, and more. They have all made important progress in mitigating or preventing the types of environmental abuse they were designed to address. There are about two hundred laws dealing with environmental protection both before and after independence in India. However, the pre-independence laws have not dealt with environmental protection exclusively. For example, the Indian Penal Code (IPC), 1860, had a chapter (chapter XIV) which dealt with offences affecting public health, safety and convenience, which covered aspects like water, air and noise pollution, whereas the post-independence laws mentioned above deal exclusively with environmental protection. A foundation for the application of the Precautionary Principle, the Polluter Pays Principle and Sustainable Development, having been laid down, the three principles were applied together for the first time in by the Supreme Court in *Vellore Citizens Welfare Forum v. Union of India*, a case concerning pollution being cause due to the discharge of untreated effluents from tanneries in the state of Tamil Nadu. The Court, referring to the precautionary principle, polluter pays principle and the new concept of onus of proof, supported with the constitutional provisions of Art. 21, 47, 48A and 51A (g) and declared that these doctrines have become part of the environmental law of the country.

Environmental law includes human rights discourse. It relates to rights of human beings who have major role to play in protection of environment. Virtually all of the nation's natural

resources – wildlife and ecosystems, air and water, public lands and bodies of water – are in trouble. For example, in India supply of fresh water is drying up, the nation's wetlands are dwindling, its forest and grazing lands are suffering, and fish populations are plummeting. So for all the good intended and accomplished by existing environmental laws, if the objective is to preserve the environment for successive generations, we are failing. Even though we have identified specific threats and taken aim at them, we continue to pursue a policy – consciously adopted or not – of spending down natural resources to meet current economic objectives rather than preserving a sufficient supply of these resources for future generations. The ancient Indian religious literature, for example, Vedas, Upanishads, Smiritis and Dharmas preached a worshipful attitude towards earth, sky, air, water, plants, trees, and animals and enshrined a respect for nature and environmental harmony and conservation. It regarded sun, air, fire, water, earth and forest as God and Goddesses. Many animals, birds, trees and plants were associated with the names of God and Goddesses. The mid nineties saw the Supreme Court recognize some internationally accepted and important principles in matters pertaining to the environment. This period also saw the Supreme Court rely more and more on Article 21 of the Constitution and give an expansive meaning to 'environment' taking within its fold the quality of life as distinguished from a mere animal existence. This is really the period when environmental jurisprudence began to come into its own.

To fulfil its promise made at the Stockholm Conference, the Indian Parliament passed the 42<sup>nd</sup> Amendment to the constitution in 1976 and incorporated specially two articles relating to protection and improvement of the environment. Thus, India became the first country in the world to have provisions on the environment in the Constitution. Judiciary, to fulfil its constitutional obligations was and is always prepared to issue appropriate orders, directions and writs against those persons who cause environmental pollution and ecological imbalance. This is evident from a plethora of cases decided by starting from the Ratlam Municipality Case. This case provoked the consciousness of the judiciary to a problem which had not attracted much attention earlier. The Supreme Court responded with equal anxiety and raised the issue to come within the mandate of the Constitution. The Supreme Court, in Rural Litigation and Entitlement Kendra v. State of U.P. ordered the closure of certain limestone quarries causing large scale pollution and adversely affecting the safety and health of the people living in the area. Likewise, in M.C. Mehta v. Union of India, the court directed an industry manufacturing hazardous and lethal chemicals and gases posing danger to health and life of workmen and people living in its neighbourhood, to take all necessary safety measures

before reopening the plant. In an attempt to maintain the purity and holiness of the River Ganga, tanneries polluting the sacred river were ordered to be closed down. Judicial activism in India provides an impetus to the campaign against pollution. The path for people's involvement in the judicial process has been shown. If this had not been done so, the system would have collapsed and crumbled under the burden of its insensitivity.

The environmental laws which have been passed by the Parliament and State Legislatures are based on the recognition of clean environment as a human right or fundamental right. Equity considerations are also important in environmental policy making. When the distribution of income is highly skewed and about one-third of the population live below the poverty line intergenerational equity must be of social concern. The reason is that the poor are the victims of environmental degradation even though their contribution to environmental degradation is proportionately less than that of the rich. Further, the poor do not have the means to undertake averting expenditures to protect them from various environmental hazards. It is necessary to emphasise that problem of environmental degradation can be tackled only by concerted efforts by every person, organisation and institution and by extremely stringent enforcement of the laws. We have to educate, spread awareness, involve and motivate every child, woman and man in the country to conserve the local flora and fauna, soil and water resources and all other gifts of God which are national properties and belong to all and to none individually.

One of the most significant developments of PIL is that it has helped courts to develop new and important principles to cope with the menacing problem of environmental pollution/ degradation. Such important developments are the introduction of “precautionary principle” and “polluters pay principle” in various cases. It is necessary to emphasise that problem of environmental degradation can be tackled only by concerted efforts by every person, organisation and institution and by extremely stringent enforcement of the laws. We have to educate, spread awareness, involve and motivate every child, woman and man in the country to conserve the local flora and fauna, soil and water resources and all other gifts of God which are national properties and belong to all and to none individually. There has been a paradigm shift over the concept of right to environment since the last three decades, primarily after a series of global cooperative initiatives. Among these, the Stockholm Conference played a significant role in throwing light on environmental degradation that has been caused worldwide. As a result, the international stature of environmental & ecological balance has been enhanced to such a level which the countries of the world had never imagined in history.

The Courts in India have played a distinguishing role in gradually enlarging the scope of a qualitative living by applying various issues of environmental protection. Consequently, activities posing a major threat to the environment were curtailed so as to protect the individual's inherent right to wholesome environment. Art 21 has been relied in the plethora of cases, although certain cases have incorporated a wider perspective of the Constitution.

Reference:

- Chhatrapati Singh, “*Legal Policy for Environmental Protection*”, in Law and Environment (P. Leelakrishnan (ed.), Lucknow: Eastern Book Co., 1992).
- LexisNexis Student Series Environmental Law Case Book- P Leelakrishnan.
- Ayesha Dias, “*Judicial Activism in the Development and Enforcement of Environmental Law: Some Comparative Insights from the Indian Experience*”, 6(2) Journal of Environmental Law 243 (1994).
- Hindustan Times, The Tribune, The Times of India and The Hindu all dated 8, 16, 25,28th April 2016.
- Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention, Michigan Law Review, Vo. 68 Part 1 p.473.
- Eastern Book Company: Environmental Law- Prof.Satish C. Shastri.
- Charmion Barton: The Status of the Precautionary Principle in Australia (Vol.22) (1998) Harvard Environment Law Review.

- Historic Pollution – Does the Polluter Pay? By Carolyn Shelbourn – Journal of Planning and Environmental Law, August 1974.
- C.M. Jariwala, “*Changing Dimensions of Indian Environmental Law*”, in Law and Environment (P.Leelakrishnan (ed.), Lucknow: Eastern Book Co., 1992).
- Bajaj R. 1996 CITES and the wildlife trade in India New Delhi: Centre for Environmental Law, WWF-India.
- MoEF <http://envfor.nic.in> Ministry of Environment & Forests, Government of India.
- WWF-India. 1999 Strengthening Environmental Legislation in India Prepared for Asian Development Bank, Manila and Ministry of Environment and Forests, Government of India Centre for Environmental Law, WWF-India.
- Divan S and Rosencranz A. 2001 Environmental law and policy in India, cases, materials and statutes, 2nd edition New York: Oxford University Press.
- Government of India (Department of Science and Technology), 1980. Report of the (Tiwari) Committee for Recommending Administrative Measures and Legislative Machinery for Ensuring Environmental Protection, New Delhi.

## **Comment on World Cultural Festival along Yamuna River in Delhi in March 2016**

Juri Goswami

Guest Faculty Assam, Donbosco University.

Dr. Kishor Dere

Advocate Supreme Court.

In early March, India's top environmental court i.e. National Green Tribunal (NGT) as well as the apex court (Supreme Court) disposed off petitions on the sensitive issue of 'damage to ecology, environment, biodiversity and aquatic life in Yamuna river'.<sup>1</sup> The context was holding of the World Cultural Festival along the floodplains of Yamuna River in National Capital Territory of Delhi by the Art of Living Foundation. It was meant to celebrate the 35<sup>th</sup> anniversary of the Art of Living Foundation led by Sri Sri Ravishankar. There was, however, a lot of commotion in the run-up to this international event. The scale and magnitude of this event can be easily seen by learning that 37,000 artists were going to perform, and about 3.5 million people were going to attend.<sup>2</sup>

This had made the cultural project result in far-reaching ramifications for the environment. First, the construction undertaken to erect the largest ever stage covering 2.83 hectares of land had led to irreversible damage to the ecologically-sensitive stretch of land flanked by the Delhi-Noida Toll Bridge on one side, and the Yamuna on the other. While the National Green Tribunal (NGT) had already issued directives for revitalisation and conservation of the Yamuna, the festival's construction activity violated the NGT's orders. The widespread damage to the natural ecosystem on the floodplains across 60 hectares on the western side of the river had led to a major imbalance in the fragile ecosystem. Weeds and trees were uprooted to create a flat tract of land for construction. This made several migratory birds and other marine life to get displaced from the locality, with some even killed. The pontoon bridges, mobile toilets, and parking sites have left a serious impact on the Yamuna plain. While the National Green Tribunal (NGT) had issued orders regarding the revitalisation and

---

<sup>1</sup> Paragraph 7 of NGT verdict on Art of Living Foundation case, 10 March 2016

<sup>2</sup> Sri Sri Ravishankar's interview to *India Today*, 10 March 2016, <<http://indiatoday.intoday.in/story/exclusive-i-see-ulterior-motives-behind-protest-against-yamuna-event-says-sri-sri-ravi-shankar/1/616502.html>>

conservation of the Yamuna, the festival's construction activity clearly violated the NGT's earlier orders.

Those who had raised serious objections to holding of this event had argued that the organisers were blatantly violating well-established environmental norms, rules and regulations. The organisers, however, claimed in the NGT as well as the Supreme Court that these allegations had no basis. Sri Ravishankar himself had said in an interview to *India Today* that the protestors had ulterior motives.<sup>3</sup>

There was an uproar in Indian Parliament as well on this highly controversial issue.<sup>4</sup> Though Finance Minister Arun Jaitley had asserted in Rajya Sabha that the matter could not be raised in the House as it was already in a court, the agitated opposition members had rushed into the well shouting slogans, forcing a brief adjournment. Left leader Sitaram Yechury had asked why the Indian Army was being used in the preparation for the cultural event. Janata Dal-United (JDU) leader Sharad Yadav and Congress leader Ghulam Nabi Azad had given notice under Rule 267 seeking adjournment of proceedings to discuss the issue. Deputy Chairman P J Kurien had ruled that since the former's notice was not in order, he was allowing the issue to be raised as a Zero Hour submission. Azad clarified that his party members are not against Art of Living, but there were valid concerns about damage to environment. He reminded that the Environment Minister and Prime Minister had attended the Climate Summit in November-December 2015 but right in the national capital, such an event in taking place in the Yamuna floodplains. Terming the construction of temporary structure on the flood plains of Yamuna for Art of Living World Culture Festival from March 11 to 13 as "destruction unseen in history", Yadav said NGT had earlier given orders disallowing construction activity on the ecologically fragile zone and DDA had cancelled permission twice. He sought to know "under what pressure was Indian Army deployed to build pontoon bridge for one person". Demanding immediate stoppage of the construction, he said, "What function is he (Sri Sri Ravi Shankar) doing? *Kya tamasha kar raha hai* (what drama is he doing)?"<sup>5</sup>

It may be recalled that despite all the concerns raised, Delhi Chief Minister Arvind Kejriwal and Prime Minister Narendra Modi were both reticent on issue because the festival was hosted by "a spiritual guru with substantial following. While Modi had supported the festival

---

<sup>3</sup> Sri Sri Ravishankar's interview to *India Today*, <<http://indiatoday.intoday.in/story/exclusive-i-see-ulterior-motives-behind-protest-against-yamuna-event-says-sri-sri-ravi-shankar/1/616502.html>>

<sup>4</sup> News18.com, 9 March 2016 <<http://www.news18.com/news/politics/centre-defends-art-of-living-event-says-sri-sri-ravi-shankar-committed-to-protecting-environment-1213935.html>>

<sup>5</sup> *Ibid.*

by attending it, Kejriwal had held out an olive branch after the National Green Tribunal slapped on the Art of Living guru a Rs 5 crore fine, which he initially refused to pay.<sup>6</sup>

The NGT in its order had allowed the WCF to be held. Its first paragraph read as follows:

For the reason of delay and laches on the part of the applicant in approaching the Tribunal and for the reason of fait accompli capable of restoration and restitution, we are unable to grant the prayer of prohibitory order and a mandatory direction for removal of construction and restoration of the area in question to the applicant at this stage.<sup>7</sup>

This speaks volumes of the way in which environment protection is being done in India. It was more a political issue and less an ecological issue. Even the political parties opposing this event had a lot to answer. For instance, in an interview Sri Ravishankar had said:

I just have one question for those making hullabaloo over the event. Why are you not concerned about the environment at Batla House? Commonwealth Games village was also built ... two wrongs can't make one thing right but what I am saying is that there is some motive behind this sudden protest against the event. Some ulterior motives...<sup>8</sup>

Responding to the criticism by the Opposition parties that the Modi government went out of its way to grant permission for the World Cultural Festival, Sri Sri Ravi Shankar said, “I request them not to politicise this. We haven't taken any favours. This is an event of very big magnitude. It is bigger than FIFA, World Cup ...”<sup>9</sup>. Unfortunately, there was hardly any satisfactory response from any of the political critics of the event.

Therefore, the NGT judgement blames a number of government agencies both Union and NCT Delhi for not doing their job as required by the law of the land. For example in its order in paragraph 3, the Tribunal says it is dealing with the ecological, environmental and biodiversity damage done to the river and the flood plains by the activity of the Foundation, not the cultural event. In paragraph 4 the NGT expresses its inability to accept the plea that it

---

<sup>6</sup> Archana Dalmia, “Lessons from Sri Sri Ravi Shankar: We must stop harming the environment in the name of culture and religion”, 17 March 2016, <<http://www.dailymail.co.uk/indiahome/indianews/article-3497543/Lessons-Sri-Sri-Ravi-Shankar-stop-harming-environment-culture-religion.html>>

<sup>7</sup> Paragraph 1 of NGT verdict on Art of Living Foundation case, 10 March 2016

<sup>8</sup> Sri Sri Ravishankar's interview to *India Today*, <<http://indiatoday.intoday.in/story/exclusive-i-see-ulterior-motives-behind-protest-against-yamuna-event-says-sri-sri-ravi-shankar/1/616502.html>>

<sup>9</sup> *Ibid.*

DPCC was nobody to grant or refuse permission to the Foundation for making such construction and how it would deal with the sewerage, solid waste generated and the source of water supply for holding such a huge gathering at the event. In paragraph 5, the NGT order points out that Police Department, Fire Department and Ministry of Water Resources, River Development and Ganga Rejuvenation, responsible for conservation, development, management and control of water pollution of Yamuna river had failed to exercise due diligence in fulfilment of their public duties.

In paragraph 5 itself, the NGT alludes to the fact that the information provided by the applicant was “incomplete, vague and uncertain” which it did not provide concrete details, evidence, total plan of such a construction, levelling activity and also construction of other approach roads, pontoon bridges, ramps, parking and a huge stage admeasuring 40 ft. high, 1000 ft. long and 200 ft. wide to any of the agencies or authorities.

All the aforesaid points make it abundantly clear that the well-known environmental protection principles such as sustainable development, environmental impact assessment, precautionary principle, polluter pays, inter-generational equity, intra-generational equity, equal access to justice, monitoring, reporting and disclosure, domestic enforcement are not being followed in letter and spirit. There is selective amnesia even on these crucial issues. It is indeed quite sad, disappointing and disheartening to learn about such developments. Let us hope that as we face severe droughts, floods, earthquakes, and many more such calamities, the events of this kind do not recur in future. In other words what is required is compliance with the environmental law.

## **Protection of Legal Rights of Tribal People & Wildlife Conservation**

Dr.Sujata Shrivatava  
Principal, APN Law College, Cantt. Jabalur,M.P.  
sujatashrivastava05@gmail.com

### **Introduction**

To live in harmony with nature has been an integral part of Indian culture and has been reflected in a variety of traditional practices, religious beliefs, rituals, arts and crafts etc. and in the daily lives of the Indian people from time immemorial. The present day global concerns for sustainable development and conservation of natural resources spanning the two decades between the Stockholm Conference of Environment in 1972 and the United Nations Conference on Human Environment and Development (the Earth Summit) at Rio de Janeiro in 1992 are of recent origin in compare to the long tradition and cultural ethics of nature conservation in India.

### **The Indian Tradition**

For the people of India, environmental conservation is not a new concept. Historically, the culture and civilization of our country have developed on the river banks and amidst the dense forests. The protection of nature and wildlife was a matter of faith and reflected in the daily lives of people, enshrined in myths, folklore, religion, arts, and culture. Manusmriti declares the cutting of green trees an 'offence'. Kautilya has provided in his Arthashastra that it is duty of the king to guard, upkeep and plants the forests for his Kingdom.

Scriptures and preaching that exhort reverence for nature and relate to conservation can be found in most of the religions that have flourished in the Indian subcontinent. Hinduism, Buddhism, Jainism, Christianity and Islam place great emphasis on the values, beliefs, and attitudes that relate to the respect for nature. The concept of sinning against nature existed in various religious systems. Many of the rituals which to modern society may seem meaningless and superstitious were traditional strategies to preserve the intrinsic relationship between man and nature. The worship of trees, animals, forests, rivers, and the sun, and considering the Earth itself as Mother Goddess, were part of the Indian tradition. Thus India had a culture of worshiping nature in all its glory.

## **Wildlife Conservation**

Wildlife conservation is the regulation of wild animals and plants in such a way as to provide for their continuance. Efforts are aimed at preventing the depletion of present populations and ensuring the continued existence of the habitats targeted species need to survive. Techniques involve establishment of sanctuaries and controls on hunting, use of land, importation of exotic species, pollution, and use of pesticides. A simpler definition of wildlife conservation is the management of species through sustainable practices to ensure future generations can enjoy it as well.

Conservation is not to be confused with preservation. Preservation is the idea that humans should leave wildlife alone, sanctuaries should be created and humans should have no contact with the animals. Conservation uses direct involvement from humans through habitat restorations, refuges, hunting and photo safaris.

## **Tribal People / Scheduled Tribes / Adivasi**

The word 'Adivasi' that is original inhabitants is an umbrella term for an ethnic and tribal groups believed to be the indigenous population in India. Officially the Indian government used the term 'Scheduled Tribes' in the Vth Schedule of the Constitution of India. Though the term Scheduled Tribes is not defined, instead Article 336 (25) refers to 'Scheduled Tribes' as those communities who are schedule in accordance with Article 342 of the Constitution. Whereas Article 343 states that the 'Scheduled Tribes' are the tribes and tribal communities that have been declared as such by the President through public notification.

## **Residence of Scheduled Tribes**

India's forests are home to peoples, including many Scheduled Tribes, who live in or near the forest areas of the country. Total population of Scheduled Tribes is 84,326,240 as per the Census 2011 which accounts for 8.2% of the total population of country. Majority of the scheduled tribe population live in rural areas and their population is 10.4 % of the total rural population of the country. Forests provide sustenance in the form of minor forest produce, water, grazing grounds and habitat for shifting cultivation. Moreover, vast areas of land that may or may not be forests are classified as "forest" under India's forest laws, and those cultivating these lands are

technically cultivating "forest land". Since times immemorial, the tribal communities of India have had an integral and close knit relationship with the forests and have been dependent on the forests for livelihoods and existence. The relationship was mutually beneficial and not one sided.

## **Legal Framework for Wildlife Conservation in India**

India has some of the most stringent legislations to protect wildlife and habitats. The Government of India has introduced various types of legislation in response to the growing destruction of wildlife and forests. These are:

### **1. Conservation and Protected Area Laws under British India**

In India, the majority of the population depends on land and forests for their survival and livelihood, ownership and utilization of forest resources were vested with local communities or traditional governance structures until the advent of the British. The administration of the natural resources and its forest wealth in India started in 1864 by the British followed by the Indian Forest Act of 1865, which was the first attempt at legislation. It was replaced by the Indian Forest Act of 1878, amended in 1890, 1901, 1918 and 1919. With this began the shift in ownership of forests from people to the State thereby leading to the beginning of the conflict between State and communities over protection and utilization of forests.

To make forest laws more effective and to improve the Indian Forest Act of 1878, a new comprehensive Forest Act was passed in 1927 which repealed all the previous laws. The Act consists of 86 sections divided into 13 chapters. The Act brought in three significations legal entities into the forest policy – the specific interpretation and legal mechanisms in defining Reserved Forests, Village Forests and Protected Forests. The concept of protected forests takes roots in this Act, giving the State government the right to declare any forest lands or waste lands not declared as reserved forests, as protected forests and prohibit/restrict the rights of private persons on these lands. The other important section of the Act which has not been implemented is the creation of village forests assigning rights over certain reserved forests to any village-community.

### **2. Conservation and Protected Area Laws in Independent India**

#### **2.1 Constitutional Safeguards for Tribal People**

India followed a policy of social protection towards the marginalized sections of the country, like the scheduled castes and the scheduled tribes. The majority of the Scheduled Tribal population lives in the hilly and forest areas and their basic sustenance and livelihood are dependent on the natural and forest resources around them. The 8.6% tribal population is protected by the Fifth Schedule of the Indian Constitution through legal mechanisms of ownership over lands and resources in the areas earmarked as the Scheduled Areas. FIFTH SCHEDULE is the constitutional safeguard for the tribal people in India and deals with “Provisions as to the Administration and Control of Scheduled Areas and Scheduled Tribes”. Fifth Schedule Article 244(1) Part 2 (a) prohibit or restrict the transfer of land by or among members of the Scheduled Tribes in such area (b) regulate the allotment of land to members of the Scheduled Tribes in such area.

## **2.2 The Wildlife (Protection) Act, 1972 (Amended in 2006)**

The Wildlife (Protection) Act 1972 is an important statute that provides a powerful legal framework for: Prohibition of hunting; Protection and management of wildlife habitats; Establishment of protected areas; Regulation and control of trade in parts and products derived from wildlife and Management of zoos.

The Act also provides for several categories of Protected Areas/Reserves. They are National Parks; Wildlife Sanctuaries; Tiger Reserves; Conservation Reserves and Community Reserves.

National parks and Tiger Reserves are by law more strictly protected, allowing virtually no human activity except that which is in the interest of wildlife conservation. The amended Act does not allow for any commercial exploitation of forest produce in both national parks and wildlife sanctuaries, and local communities can collect forest produce only for their bona fide needs.

Community reserves and conservation reserves are two new categories of protected areas that have been included under the Act. These two categories provide a greater role for local communities, stakeholders and civil society as well as the opportunity to protect many areas of conservation value that cannot be designated under strict categories such as wildlife sanctuaries or national parks.

The Act contains elaborate procedures for dealing with legal rights in proposed protected areas and acquisition of any land or interest under this law is deemed as an acquisition for a public purpose.

The 2006 amendment introduced a new chapter (IV B) for establishment of the National Tiger Conservation Authority and the Wildlife Crime Control Bureau (WCCB) was constituted to monitor and control the illegal trade in wildlife products.

The Act provides for investigation and prosecution of offences in a court of law by authorized officers of the forest department and police officers.

### **2.3 The Forest Conservation Act (1980)**

In order to check rapid deforestation due to forestlands being released by State Governments for agriculture, industry and other development projects (allowed under the Indian Forest Act) the federal government enacted the Forest Conservation Act in 1980 with an amendment in 1988. The Act made the prior approval of the federal government necessary for de-reservation of reserved forests, logging and for use of forestland for non- forest purposes.

This powerful legislation has, to a large extent, curtailed the indiscriminate logging and release of forestland for non-forestry purposes by state governments. While the federal government imposed such strict restrictions, it did not simultaneously evolve a mechanism to compensate state governments for loss of timber logging revenues. This anomaly coupled with increasing pressure for land due to a burgeoning population has generated considerable resentment within state governments resulting in growing pressure to dilute the restrictive provisions of the Act. The Supreme Court of India has currently imposed a complete ban on the release of forestland for non-forestry activities without the prior approval of the federal government.

### **2.4 The Environment (Protection) Act, 1986**

The Environment Protection Act is an important legislation that provides for coordination of activities of the various regulatory agencies, creation of authorities with adequate powers for environmental protection, regulation of the discharge of environmental pollutants, handling of hazardous substances, etc. The Act provided an opportunity to extend legal protection to non-forest habitats ('Ecologically Sensitive Areas') such as grasslands, wetlands and coastal zones.

## **2.5 The Panchyats (Extension to Scheduled Areas) Act, 1996 (PESA)**

The most significant legislative protection for the tribal people in support of the Fifth Schedule is the enactment of the 73rd Amendment Act (Act. No.40) of 1996 which is known as the Panchyats (Extension to Scheduled Areas) Act and came to be adopted in most of the States with scheduled areas, with corresponding laws. The Act clearly states the supremacy of the Gram Sabha (the decentralized unit of governance in the tribal areas) in the Scheduled Areas and right to self rule and governance of the tribal people. It empowers the Gram Sabhas to have control over resources and the right to “customary law, social and religious practices and traditional management practices of community resources.”

## **2.6 The Biological Diversity Act 2002**

India is a party to the United Nations Convention on Biological Diversity. The provisions of the Biological Diversity Act are in addition to and not in derogation of the provisions in any other law relating to forests or wildlife.

## **2.7 The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006**

The Act was enacted to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded; to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land.

### **Administrative Action**

1. National Forest Policy (1998) The National Forest Policy, 1988, (NFP) is primarily concerned with the sustainable use and conservation of forests, and further strengthens the Forest Conservation Act (1980). It marked a significant departure from earlier forest policies, which gave primacy to meeting government interests and industrial requirements for forest products at the expense of local subsistence requirements. The NFP prioritizes the maintenance of ecological balance through the conservation of biological diversity, soil and water management, increase of tree cover, efficient use of forest produce, substitution of wood, and ensuring peoples’

involvement in achieving these objectives. It also legitimizes the customary rights and concessions of communities living in and around forests, stating that the domestic requirements of the rural poor should take precedence over industrial and commercial demands for forest products.

2. National Wildlife Action Plan (2002-2016). This Plan was introduced in response to the need for a change in priorities given the increased commercial use of natural resources, continued growth of human and livestock populations, and changes in consumption patterns. The Plan most closely represents an actual policy on protection of wildlife. It focuses on strengthening and enhancing the protected area network, on the conservation of endangered wildlife and their habitats, on controlling trade in wildlife products and on research, education, and training. The Plan endorses two new protected area categories: “conservation reserves,” referring to corridors connecting protected areas, and “community reserves”, which will allow greater participation of local communities in protected area management through traditional or cultural conservation practices. These new categories of protected areas are likely to bring in corridor areas under protection. The Plan contains various recommendations to address the needs of local communities living outside protected areas and outlines the need for voluntary relocation and rehabilitation of villages within protected areas.

## **Conclusion**

Wildlife is one of the basic and natural resources that satisfied the needs of people from time immemorial. Therefore these resources must be conserved, preserved and protected for the existence of mankind. To a large extent, wildlife and forest laws in India have had the most serious impacts on tribal communities whose customary laws and practices have been worst affected and even the constitutional safeguards provided to them stand threatened by newer shifts in forest and other economic policies. The State should made such forest and wildlife policy by stating the need to consider local community interests for utilization of forest resources and for involvement of local communities in protection and regeneration of forests. Unlike other environmental losses, this one cannot be reversed because nature does not give second chances to biodiversity.

**References:**

Doabia, Justice T.S. "Environment & Pollutions Laws in India", Vol. I & II Lexis Nexis, Butterworths, Nagpur, Wadhwa and Co. (2010).

Kalish Thakur, "Environmental Protection Law & Policy in India" Deep & Deep Publishing Co., New Delhi. Leelakrishnan, P. "Law and Environment Law", EBC, Lucknow.

R.B.Singh & Suresh Mishra, "Environmental Law in India" Concept Publishing Co., New Delhi.

Shastri, S.C. "Environment Laws in India" EBC, Lucknow, 2014.

## **The Issues of Transgenic Crops and Biosafety in India**

Dr. Subir Kumar Roy<sup>1</sup>

Assistant Professor, Law Department, Bankura University

Bankura, West Bengal, India

*Transgenic crops are the byproduct of the modern biotechnological techniques. Through genetic modification techniques new traits are introduced into animals, crops and micro-organism to improve productivity as well as to grow resistance power against diseases, pests, etc and also to make the foods nutritionally enriched. As the GM foods are produced by altering the gene, sometime it may prove fatal for the human body as well as for bio safety. This article has neither been penned to support nor to oppose GMCs rather it, advocates in favour of stringent municipal laws to monitor the release of GMOs seeing its probable harmful impact on environment and health*

### **1. Concept of Transgenic Crops**

By using the modern biotechnology techniques the genetic make-up of the living cells and organisms of plants are modified artificially in order to, accelerate the power of resistance inside the plants against diseases, drought or insects, enhance nutritional value or the quality, to increase the tolerance of the plants against herbicide and also to enhance production of crops. Such organisms are called genetically modified organisms (GMOs) and the crops from such plants are termed as genetically modified crops (GMCs). When an artificial gene either from an unrelated plant or from completely a different species is inserted into the plant artificially is called transgenic plant or crops. Generally through using the genetic engineering techniques the DNA of the plants are modified with an aim to infuse a new trait to the plant for increasing its yields or efficiency. As per the understandings of WHO GMOs can be defined as organisms in

---

<sup>1</sup> Contact author at [Dr.roysubir@gmail.com](mailto:Dr.roysubir@gmail.com) , M- +919733215777

which the genetic material is changed in such way which does not happened naturally either by mating or by natural recombination. The genetic material is changed by virtue of transfer of selected genes from one organism into other. The above process is initiated through genetic modification techniques which allow introducing new traits into animals, crops and micro-organism to improve productivity as well as to grow resistance power against diseases, insects, pests, viruses' etc. Food produced by using GM organism is termed as GM foods.

GMCs are produced and marketed as through use of biotechnology the crops can be made pest resistant, herbicide tolerant, attractive in appearance, more nutritional and quality oriented. It has already been mentioned above that by modification of gene the productivity of crops can be enhanced and the problem of the worldwide food scarcity can be tackled. But the equations are not so simple what are being presented in favour of the GMCs. The existing situation demands to seriously consider some issues surroundings to GMCs for the betterment of humanity, ecology and economy itself. The issues are whether the GMCs can effectively address the demand of sustainable food security, whether transgenic crops are safe for human health and ecology and whether the transgenic crops will ultimately become a tool of assigning monopoly to the Multinational Companies or avocations as the modification of gene technique comes within the domain of intellectual rights and the inventor(s) or MNCs may demand patent right and ultimately which may enhance the price of the crops. If the above situation will arise then it may seriously be antagonistic to the humanity.

As the GM foods are produced by altering the gene, sometime it may prove fatal for the human body as well as for bio safety. So GMCs are required to be specifically evaluated and monitored by the municipal laws of the states related to their impact on human health and environment. As per the imperatives of WHO the safety assessment related to GMCs should cover:

- a. The effect of the toxicity of the GMCs on human health
- b. Test of allergenicity from GMCs
- c. Specific components considered to have nutritional or toxic properties
- d. The stability of the gene infused in GMOs
- e. The nutritional effects of the crops after modification of gene
- f. Any other unintended effect may cause due to infusion of gene

## **2. Impact of GMCs on Human Health**

As we know genes are the segments of DNA which carries information to produce polypeptide strand. This polypeptide strand or protein determines the traits of the organisms. This information led the scientists to engineer the recombination of DNA molecules by infusing specific genes containing desired traits from a source organism to the DNA of a living targeted organism so that desired change may occur in the nature of the targeted organism with faster and powerful way. For example resistance against insecticides is developed by induction of a gene from the bacterium *Bacillus thuringiensis* (Bt) for production of toxin. In a similar way, virus resistance is achieved through the introduction of a gene from certain viruses which are responsible for causing diseases in plants. Herbicide tolerance is also achieved through the induction of a gene from the bacterium poses resistance to herbicides. If this is the science of this transfer of gene technology the other part of the coin is also true i.e. genetic engineering can transfer the toxicants, nutrients or allergenic proteins without evaluating their impact on health in otherwise safe foods. The apprehension regarding impact of GMCs on human body arises mainly from three aspects: allergenicity, gene transfer and out crossing.

### **Allegenicity**

Though transfer of genes from allergenic organism to non-allergic organism is discarded unless it can be shown that protein product of the transferred gene is not allergenic. So there must be a strong regulatory authority to specifically examine the each GM crops. As per the report of the FAO an allergenic Brazil –nut gene was transferred into a transgenic soybean variety but fortunately its presence was found during the testing phase and accordingly that soybean was not released in market. However the WHO and FAO both the concerns assured us that no allergic effects have been found on GMCs, currently available in the market.

### **Out Crossing**

The infusion of genes from GM plants into traditional crops or mixing of conventional crops with GM crops may have a serious impact on food safety and thus may affect public health.

### **Gene Transfer**

The most apprehended impact of GMCs are the probability of transfer of gene from GM foods to human body because if this transfer will take place than it may seriously impair the human health. For example if antibiotic resistance gene are used for GMOs, that may transfer into human body and will cause serious health problem.

Apart from the above a number of scientist, agriculturalists, apprehends that the artificial insertion of gene could destabilize an organism, may go for mutation and thus may remain responsible for the growth of carcinogenic agent, though the scientific certainty or conclusive data has yet not been clinically proved in favour of the above apprehension. Insertion of a new gene in an organism may activate a 'sleeper' gene or may transform an active gene to silent. As per the findings of the FAO often the GM products have found in the food chain. As for instance the GM maize variety starlink which is made for only animals was found in human food. This has also been observed that gene that offers as antibiotic resistance is inserted into GMOs as 'marker gene'. The introduction of 'marker genes' in GMCs may cause resistance to antibiotic and as consequence it may seriously impair the human health. As for example Novartis' Bt maize contains a marker gene which becomes responsible for resistance of antibiotic named E-coli. Now a day the gene therapy is used for enhancement of nutrients which may ultimately leads towards vitamin toxicity and other ill consequences. Consumption of rice with high concentration of vitamin A for long time may prove risky for liver.

### **3. Impact of GMCs on Environment**

The blanket of doubt against GMCs still hovers that it could threaten the growth of the organic agriculture and thus may affect the biodiversity as a whole. Gm technology either itself may result in contamination of crops as it is the outcome of introduction of transgene or the outcome of the process of doctored gene or it may not go well with the environment and ecological characteristics. One of the greatest apprehensions of GMCs is that genes could escape and through cross pollination or through other way mix with other members of the same species and other species. Once a gene introduced in GMOs certainly, will not confined within that plant rather interaction may take place at gene, cell, plant and ecosystem levels. As for illustration an herbicide- resistance genes got into weeds in wild habitats, and as a consequences of that may turn them into super weeds. By the use of biotechnology the GMOs are made resistant to a particular pest or disease and which in long run may prove fatal or injurious for a non targeted

species which are in reality either harmless or beneficial for ecosystem like birds, pollinators and micro-organisms. Still the in-depth research is required regarding the impact of GM pollen on bees or the impact of insertion of gene in plant to fungi, soil and bacteria. As per the existing scientific study it has been seen that Bt maize pollen may be toxic to the Monarch butterfly but in long run it may pose a threat to the other butterflies too. It has also been observed that pests can develop resistance to toxin caused by implanted gene which is considered as bio-pesticide. As for example it has been found that insects develop resistance against Bt crops.

GMCs may prove a serious threat to crop biodiversity. GM organisms may compete with the diverse species of the ecosystem in order to establish monoculture of agriculture which in turn may cause serious loss to varieties of traditional crops. The most dangerous aspect of GMO is that the introduction of an alien gene in the organism becomes irreversible i.e. after introduction of a GM crop it cannot be stopped from functioning afterwards even if it appears dangerous for the diversity of species of nature. The apprehension is often raised from the different camps that the environmental costs will downplay the advantages or benefits informed by the crops engineered through the use of biotechnology.

#### **4. The Socio-Economic Dimension of GMCs**

Genetically modified crops are quite different from the traditionally modified plant gene developed into the organism by way of cross breeding and specific sexual process. For millennia our farmers have the knowledge to modify plant gene by the use of advanced biology and genomics in order to develop crops best suited for human consumption with adequate nutrients. In contrast to above GMCs are the outcome of modern devices of genetic engineering whereby the traits are transferred from the distantly related plants to recipient plants. As per the Protocols for Food and Feed Safety Assessment of GE Crops (2008), prescribed by the Department of Biotechnology, Ministry of Science and Technology, Government of India defined Genetically Engineered Plant as “a plant in which the genetic material has been changed through in vitro nucleic acid techniques including recombinant-deoxyribonucleic acid (r-DNA) and direct injection of nucleic acid into cells or organelles.” Since the technology of introduction of genetic material into recombinant DNA plants is completely a novel idea caused by genetic engineering attracts the protection of patent regime. As a matter of fact few multinational companies have virtually acquired a monopoly on GM technology and among them Monsanto has become the giant

company of GMCs. Certainly, monopoly of few on market of foods will not go well with the food security. Not only that, the farmers who own small plots of lands and in economically disadvantageous position cannot afford the GM technology with high costs and without having the guarantee of getting higher yields.

## **5. Transgenic Crops in India: An Evaluation**

So the GMCs has its both advantages and disadvantages. It is worthwhile to mention here that, despite of having the shortcomings of GM technics it is an evidence of wonderful growth of science and technology and incorporated to develop productivity of crops with balanced and enriched nutrients in order to ensure food security across the globe. Scientific inventions are the byproduct of the curiosity or inquisitiveness of the human mind, which cannot be banned or stopped through imposition of law rather it can only be regulated for public purposes. This logic is equally applicable to GMCs and it is the need of the hour to apply precautionary principles while regulating GM organisms. Precautionary principle demands that absence of scientific certainty cannot be used as a plea for polluting the planet. Though In India, at present we are using the GM technology in terms of Bt cotton only as there is a divergent of opinion among the agriculturalists and scientists on the question of efficacy of the GMCs and due to that reason the lots of huge and cry had taken place against the cultivation of Bt brinjal but in spite of all, this is not a very important question that whether we allow the GMCs or not rather the question which is needed to be considered with utmost priority is that whether we have the proper regulations to keep constant watch on the impact of technology related to GM organisms on human health and environment. The risk factor of GMCs are required to be examined individually.

In India, the transgenic crops are being regulated by the Environment Protection Act, 1986 under which the Rule has been framed as “Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms/Genetically Engineered Organisms or Cells 1989” commonly referred as Rules 1989 by the Ministry of Environment and Forests (MoEF), Government of India on December 5, 1989. Under the Rules 1989 Ministry of Environment and Forests (MoEF), and the Department of Biotechnology (DBT), Government of India regulates the matters related

to GMCs. MoEF and DBT enforce the rules regarding GMOs through six competent authorities namely:

1. Recombinant DNA Advisory Committee (RDAC);
2. Genetic Engineering Approval Committee (GEAC);
3. Review Committee on Genetic Manipulation (RCGM);
4. Institutional Bio safety Committees (IBSC);
5. State Biotechnology Coordination Committees (SBCC);
6. District Level Committees (DLC).

We have Recombinant DNA safety Guidelines, 1990 framed by the Department of Biotechnology and which has been subsequently revised in the year 1994 to include GMOs. The guidelines include safety measures to be observed during research activities involving GMOs, restrictions during field trials of transgenic materials, precautions during use of rDNA technology in vaccine development and large scale production, regulatory measures to ensure safety for import of genetically engineered materials, plants and animals etc.

Seeing the enormous progress in the field of recombinant DNA research and increasing use of it in microbial strains, cell lines and transgenic plants for commercial exploitation DBT framed the Revised Guidelines For Research In Transgenic Plants & Guidelines For Toxicity And Allergenicity Evaluation Of Transgenic Seeds, Plants And Plant Parts, 1998.

Apart from the above we have National Seeds Policy, 2002 which recognises the importance of biotechnology in the field of agriculture and promises for a conducive atmosphere for the growth and research of genetic engineering. The above policy also took notice of the possible ill effects of GMOs on human health and bio-safety.

But, despite of having the various rules and regulations on transgenic crops it has been found that often GMOs are allowed to be released without proper scientific investigation about its possible impact on human health and environment and which has been virtually endorsed by the Supreme Court of India in the case Aruna Rodrigues and ors V Union of India [Writ Petition (Civil) No. 260 of 2005]. However the Supreme Court in its judgment (delivered on May 10, 2012) on the

above case refused to give moratorium against field trials of GMOs but constituted a Technical Committee to review the matters related to GMOs. The above judgment clarifies the need of one specific and strong technical authority to monitor the matter of GMOs.

## References:

1. European Food safety Authority  
[http://www.efsa.europa.eu/sites/default/files/scientific\\_output/files/main\\_documents/2150.pdf](http://www.efsa.europa.eu/sites/default/files/scientific_output/files/main_documents/2150.pdf) (accessed on 2nd may, 2016)
2. World Health Organisation,  
[www.who.int/foodsafety/publications/biotech/20questions/en/](http://www.who.int/foodsafety/publications/biotech/20questions/en/) (accessed 2<sup>nd</sup> may, 2016)
3. Weighing the GMO arguments... [www.fao.org/english/newsroom/focus/2003/gmo8.htm](http://www.fao.org/english/newsroom/focus/2003/gmo8.htm)  
(accessed 6<sup>th</sup> May, 2016)
4. Raising Agricultural Productivity and Making Farming Remunerative for Farmers, an occasional paper, *NITI Aayog, Government of India*  
[niti.gov.in/mgov.../Raising%20Agricultural%20Productivity%20and%20...](http://niti.gov.in/mgov.../Raising%20Agricultural%20Productivity%20and%20...)(accessed on 6<sup>th</sup> May, 2016 )
5. Protocols for Food and Feed Safety Assessment of GE crops, Department of Biotechnology  
Ministry of Science and Technology Government of India, 2008
6. Modi and Modified Crops, Economic and Political Weekly, Vol.XLIX No.30, July 26, 2014
7. Genetically Modified Crops: Policy Logjam, Sachin Chaturvedi, Krishna Ravi Srinivas, Economic & Political Weekly, April 6, 2013 vol xlviii no 14
8. The Politics of Precaution: Genetically Modified crops in developing Countries, Robert L. Paarlberg, IFPRI, The The Johns Hopkins University Press Baltimore and London

9. Fielding Trials for Genetic Engineering, Shalini Bhutani, Manju Menon, Kanchi Kohli,  
June 21, 2014 vol xlix no 22 25 Economic & Political Weekly

## **Ocean Acidification: A Danger yet Uncovered**

Monmi Gohain

Research Associate

National Law University, Assam

It is generally seen that as on account of rapid industrialization and other developments there is massive pollution of air, water and the land. One of the harsh effects which can be felt every now and then is the emission of the carbon dioxide and other chemicals into the atmosphere. The most common consequences of these harmful emissions which is known to the world is about the global warming. Apart from the human activity, fossil fuel combustion also release tons of carbon dioxide and other into the atmosphere. This also has a harmful effect on the air as well as water. But what the world is not aware is of the changes which is being felt in the seas and oceans. It is known as the acidification of ocean water which is as a result of the absorption of carbon dioxide by the ocean water. In the initial stages of human civilization though this concept was known to the world but the effects of the same were not realized, but with the increased absorption and increase in level of the acidity of the ocean water, it is ultimately posing a threat to the marine biology present in the seas and oceans.

### **Role of carbon cycle**

It is an established fact that there is continuous exchange of between three levels of carbon within the atmosphere namely ocean, atmosphere and the terrestrial biosphere. The carbon dioxide which is being dissolved in the water are used by the phytoplankton living down the water during the process of photosynthesis. This is used as the building blocks for the shell formation by the zoo plankton and other organisms like the pteropod shell, mussels and corals. When these organisms die it ultimately sink into the ocean water and there it mixes with the dissolved carbon sinks into the ocean floor. It is estimated that a quarter of all the carbon dioxide released in the atmospheric is taken by the ocean. It in turns as a carbon sink which helps the carbon dioxide to

be locked up in the oceans before they are released back. This forms a part of the natural carbon cycle which is helpful in absorbing carbon dioxide from the atmosphere.

### **Ocean acidification**

It is a phenomenon which is a result of increased anthropogenic carbon dioxide which is a portion of the carbon dioxide which is as a result of the human activities such as industrial wastes and certain natural processes as the burning of fossil fuels etc. This phenomenon is mainly caused due to the reduction of Ph in the water level. When the Ph level of the water will decrease it leads to the ocean water becoming more acidic.

**Acidic water:** This is very harmful because it will endanger a quite number of the species residing in the water. The uptake of carbon dioxide by the atmosphere is changing the chemical reactions within the sea water. This is causing serious impact on the pressure of calcium carbonate saturation horizon to shall in many regions of the earth.

The main reason behind this phenomenon is the increasing carbon dioxide level in the atmosphere. It is very difficult to predict that because we generally see that the carbon dioxide stays in the air. But this fact is not known to many of us that there is a huge quantity of the carbon dioxide is dissolved into the atmosphere. For many people it might sound quite positive because the carbon dioxide leaves the atmosphere. But the harmful effect that this phenomenon has is that it changes the chemical equation of the ocean. When carbon dioxide dissolves in the sea water the Ph level of ocean water drops and it results in the ocean water becoming more acidic. It has become quite dangerous for the marine life.

## **Development of this concept**

Ocean Acidification is also known as ‘**climate change equally evil twin**’.<sup>1</sup> This particular phenomenon began many centuries ago and at that time it was balanced because the rivers carried on the dissolved material from the rocks to the oceans and it balanced the chemical equation of the oceans. Even the emissions from the volcanoes helped in the same. The Ph levels in the water has been continuously traced by the scientists but there was no such fear as the levels were intact.

But with the passage of time the level of the carbon dioxide has increased at a massive level and it has become imbalanced. Around 2003 there was a drastic increase in the Ph levels and this caused the world community to think about the concept of the ocean and sea water becoming acidic and so the term was first coined in the year 2003.

## **Causes**

- a. High amount of carbon dioxide ending up in the ocean decreases the capacity of the ocean to act as a carbon sink.
- b. Calcification of the marine flora and fauna due to inability of the sea water to dissolve it.
- c. Dumping of waste matter in a massive scale into large water bodies
- d. Decrease in PH levels of water.

## **Existing legal Framework**

### **i. The Dumping Regime**

In matters of international legal framework to protect the marine biology mention can be made of **the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter 1972 (London Convention)** which was basically on the issue of dumping of waste in water bodies. This Convention is very significant because it contributes to the prevention of marine pollution by preventing the dumping of

---

<sup>1</sup> John Heilprin, ” Acid Oceans: The 'Evil Twin' Of Climate Change”, U.S. News, Dec. 18, 2009

hazardous materials in the water. It introduced certain rules such as requirement of a special permit prior to the dumping of other identified materials and a general permit for waste or matter.

**Dumping:** Under this convention, dumping has been defined as the deliberate disposal of waste at sea or other matter from vessels, aircraft, platforms or other manmade structures as well as deliberate disposal of vessels themselves.<sup>2</sup>

- ii. **1996 Protocol to the London Convention** This convention aimed at replacing London convention. This was mainly to broaden the definition of dumping and prohibit all the except for the possibly accepted waste.
- iii. **Convention on Biological Diversity:** The parties in the convention on Biological Diversity had shown lot of interests in curbing the problem of ocean acidification in collection within the United Nations Environment Program (UNEP). It introduced a Strategic Plan for Biodiversity 2011-20. Through this strategic plan the basic idea is to start a review process to assess the impact of ocean acidification on marine bio diversity.

### **Impact of ocean acidification on marine biology and ecosystems**

The danger attached with this particular concept of ocean acidification is that the consequences of the water turning into acid cannot be estimated. The matter of concern here is that ocean acidification will lead to extinctions of certain marine species. A threat has been posed to the marine animals who are known as the '**marine calcifiers**'. They face a challenge of their shell dissolving in the acidic waters and posing threat to the habitat as well as the reproduction process. There organisms exists upon a certain level and cannot exist deep into the water. Their habitat is known as the '**saturation horizon**'. As a result of the ocean acidification, the saturation horizon is prone to shift to the closer to the surface of the oceans. It will not be suitable for the

---

<sup>2</sup> Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter

calcifiers to cope with the changing habitats. The overall effects can be classified under the following heads:

**a. Changes to the physiology of larger animals in the water**

The larger animals in the ocean such as fish and other invertebrates will be affected by weakening of respiratory systems. This means that on the reason of low concentration of oxygen in the sea water it becomes very evident for the sea creature to lose out more carbon dioxide so increased carbon dioxide concentration in the sea level will bring a change on the physiology of the larger sea animals.

**b. Changes to reproduction processes.**

The effects of increasing carbon dioxide in the water will hamper the reproductive capacity of animals. It decreases the embryo and larvae creation among different kind of invertebrates residing in the sea. It also affects the growth of the same.

**c. Effect of ocean acidification on calcifying animals**

There is the phenomenon of creation of shells by calcification among the marine animals such as molluscs, corals, echinoderms, foraminifera and calcareous algae. So increased carbon dioxide concentration decreases the calcification process among these organism and this in turn will result in weakening of coral skeletons and reef structures generally. It is being observe by the scientists that the rate of the shell formation of the calcifying animals has gradually decreased

**d. Impact of ocean acidification on the structure of marine communities**

The population among the marine communities is decreasing because of the increased level of carbon dioxide in the water. This is mainly because of the decreased reproduction among the marine animals. This is in turn reducing the habitats. This could result in slower growth or increased susceptibility to diseases.<sup>3</sup>

---

<sup>3</sup>Ocean acidification due to increasing atmospheric carbon dioxide, The Royal Society, Policy document 12/05

## **Benthic Communities**

Benthic ecosystems are these ecosystems in which the marine flora and fauna rely upon food and habitat on the sea water and even upon which we rely for food and ecosystems. Most of these communities are not immune to ocean acidification. It is totally unclear how the ocean acidification will impact the composition and functions of benthic communities. Some of them are given as follows:

### **i. Oysters, Mussels Urchins and Starfish**

The shelled animals like the oysters, starfish, and mussels are also affected because of the ocean acidification process. The trouble is with building the shells. Some of the major impacts on the organisms like the mussels is that they are unable to hold on to the rocks while pounding the surf and it decreases in acidic water.

### **ii. Zoo plankton**

The direct effect of increase of Ph level in the sea water cannot be predicted much upon the zoo planktons. But scientist have confirmed that it has an impact on the mortality, morphology, embryological development, egg hatching process etc. it also affects the community composition of the zoo plankton as the natural habitat is decreasing.<sup>4</sup>

### **iii. Marine Plants and algae**

Ocean acidification also impacts a lot on marine plants and algae. Specifically, the photosynthesis process of the marine plants are affected. It becomes limited by the excessive dissolution of inorganic carbon dioxide in the water. This also disturbs the respiration ratio of various microalgae and hence affects the reproductive capacities.

### **iv. Coral Reefs**

Coral reefs are formed by the reef building corals which form a natural habitat for the coral animals to develop and grow. But the acidification of the sea and ocean water can result in decreasing the

---

<sup>4</sup> Report on Workshop on “Impacts of Ocean Acidification on Zooplankton” by M. Brady Olson and So S Kawaguchi, PICES Press Vol. 19, No. 2, North Pacific Marine Science Organization

coral growth as it corrodes the preexisting skeletons. The skeletons which grow will be weaker and more prone to dissolution.

**v. Fish**

There is also a kind of disastrous effect on fish. There is kind of otolith formation of fish which serves as a sensory organ. This helps the body of the fish to hear and balance the body functions. This otolith layer is primarily composed of aragonite which can be dissolved easily in acidified sea water. Due to the increased pH level in water, there is the destruction of the fish larvae. So there is a much greater probability that the many species of fish may vanish in the near future.

**vi. Dungeness Crab Larvae**

The Ocean acidification process is also posing a threat on the Dungeness Crab Larvae in the North West Marine ecosystem. The destruction of larvae is leading to the deterioration the reproduction process of this species of crabs. The hatching pace of the larvae is much slower than rate at the higher pH levels. It is feared that it will ultimately affect the next generation Dungeness crabs.

**Current status of ocean acidification**

The report on the current acidification has not been done on a global scale has not been done to a great extent. The reasons behind this could be the lack of awareness and high cost of research expeditions. But some of the research has been done on the changing marine carbon system in the central Pacific like Hawaii-ocean time series (HOTs) and North Atlantic Time series (NATS) have proved that the changes which ought to happen in the ocean chemistry in the future years will be linked with the future increase in the carbon dioxide in the atmosphere. It has confirmed the decline of pH level in the ocean waters. Efforts are also being taken by the Global Ocean Data Analysis Project (GLODAP),<sup>5</sup> Carbon in the Atlantic Ocean (CARINA)<sup>6</sup>, the

---

<sup>5</sup> Key RM, KoyzrA, Sabine CL, Lee K, Wanninkhof R, et al(2004) A Global Ocean Climatology Results from Global Data Analysis Project, Global Biogeochemical Cycles 18: GB 4031.

<sup>6</sup> Key RM, Tanhua T, Olsen A, Hoppemma M, Jutterstorm S, et al(2010) The CARINA Data Synthesis Project: Introduction and Overview. Earth Systems Science Data 2: 105-121

Surface Carbon CO<sub>2</sub> Atlas (SOCAT)<sup>7</sup> and PACIFICA<sup>8</sup>. Recently international efforts are being taken to start these programs globally so there is a common platform for all the countries to work collectively to solve this problem.

## **Conclusion**

The nature and its phenomenon are unique and it is not desirable for the human to exert too much control on the processes of nature. This is partly because the interactions within the nature are more complex. So if the human beings within their development try to disturb the established systems in the nature they have to face the consequences. Because of that, a lot of processes are taking place in the nature which would not have been taught in the earlier days.

In spite of various efforts to bring out awareness in regards to the massive ocean acidification, there is much more to go before the world community realizes about the harmful effects of the same. There are serious ramifications for the marine plants and animals and there are a lot more which are yet unknown. There is a lack of proper instrumentation and proper regulatory framework to tackle the issue. So it's high time that serious steps should be taken to spread awareness among the general public, so that we can preserve our seas and oceans, and the flora and fauna living within them.

---

<sup>7</sup> Bakker D.C.E and 80 others. 2014. An Update into the Surface Ocean CO<sub>2</sub> Atlas (SOCAT Version2). Earth System Science Data, 6, 69-90.

<sup>8</sup> Suzuki T and 18 others.(2013) PACIFICA Data Synthesis Project. ORNL/CDIAC-159. NDP-092.

## **The Digital Age and 'E-Waste Crises' in India**

Minakshi Goswami (LL.M. Student)

National Law University, Assam

Technology is rapidly advancing, manual activities are replaced by high capacity electronic devices, older models are becoming obsolete very fast and as a result India has entered what can be referred to as 'e-waste crises'. 'E-waste' or 'electronic waste' includes discarded electronic devices like mobile phones, PCs, laptops, stereos, air conditioners, refrigerators and other such electronics that enter the waste stream. An e-waste crisis is an inevitable consequence of rapid technological development and progress.<sup>1</sup> At the present era of globalization and technological advancements, leading a life without computers and electronic devices is almost next to impossible. Computers, tablets, mobile phones, washing machines are organizing and making the affairs of our daily routine easier. E-products have made our lives easier with quick, convenient and easy doing of daily activities. From writing school assignments, office projects to household activities like cooking meal; we largely depend on electronic devices. Electronics, for most of us, has become an inevitable part of our lives. Though electronic devices at the present era of digitization are gaining popularity; it has also resulted in some serious concerns like e-waste crisis.

As per the definition given in Rule 3(k) of *The E-waste (Management and Handling) Rules, 2011* 'e-waste' means waste electrical and electronic equipment, whole or part or rejects from their manufacturing and repair process, which are intended to be discarded.<sup>2</sup> The E-waste (Management and Handling) Rules, 2011 or "E-waste Rules" regulates issues of disposal, import and recycling of e-wastes in order to put in place an environmentally sound e-waste management system. The E-waste Rules apply to every producer, consumer or bulk consumer (*including factories under Factories Act*) involved in the manufacture, sale,

---

1. Nisha Thakker, *India's Toxic Landfills: A Dumping Ground for the World's Electronic Waste*, available at [http://heinonline.org/HOL/Page?handle=hein.journals/sdlp6&div=83&start\\_page=58&collection=journals&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/sdlp6&div=83&start_page=58&collection=journals&set_as_cursor=0&men_tab=srchresults), last accessed on June 3<sup>rd</sup>, 2016.

2. *The E-Waste (Management And Handling) Rules, 2011*, available at [http://www.moef.nic.in/sites/default/files/notified%20ewaste%20rule%202015\\_1\\_0.pdf](http://www.moef.nic.in/sites/default/files/notified%20ewaste%20rule%202015_1_0.pdf), last accessed on June 3<sup>rd</sup>, 2016.

purchase, and processing of electrical and electronic equipment or components as specified in Schedule-I<sup>3</sup>, along with all collection centres, dismantlers and recyclers of e-waste.<sup>4</sup>

Technology is developing so fast that new, better, speedy and more reliable devices are replacing the older ones by making it outdated. Most often it can be seen that the electronic devices are discarded not because it is broken; but because it is obsolete. The constantly advancing technology and upgrades are compelling its users buy new devices and dispose of the old ones. Large Institutions and offices follow a policy of upgrading their electronic devices at regular and short intervals.

Consumers replacing their obsolete electronic devices with upgraded versions discard the unwanted products without any concern for the environment. This ever increasing greed and popularity of technology and lack of environmental concern has created a mountain of unwanted e-products with no provision for its proper disposal. Most of the e-wastes are disposed at a stage where it can still be reused, resold or recycled. The unregulated disposal of obsolete e-products releases toxic substances like mercury, lead and arsenic etc. into the ground that in turn results in soil, water and air pollution. Toxics released by e-wastes also cause cancer, respiratory illness and reproductive problems.<sup>5</sup> Most of the outdated and unwanted electronic products that are thrown away contain valuable recyclable materials like gold and copper that has a good market price. With the aim of collecting these recyclable materials scrap yard workers expose themselves to hazardous toxins on a daily basis. They tear apart electronic components with bare hands and without the minimal use of safety

---

3. Schedule-I Contains Two Categories Of Electrical And Electronic Equipments- (I) Information Technology And Telecommunication Equipments like Minicomputers, Notebooks, Notepads, Printers including Cartridges, Electrical and Electronic Typewriters, Telephones, Cordless Telephones, Cellular Telephones etc. (ii) Consumer Electrical and Electronics like Television Sets (Including LCD and LED Technology), Refrigerators, Washing Machines, ACs excluding Centralised Air Conditioning Plants.

4. Mondaq and Arya Tripathy, *India: Waste Management in India: an Overview*, available at <http://www.mondaq.com/india/x/396342/Waste+Management/Waste+Management+In+India+An+Overview>, last accessed on June 3<sup>rd</sup>, 2016.

5. Mary Loung, *Waste 2.0: Updating California's Electronic-Waste Recycling Policies for the Digital Age*, available at [http://heinonline.org/HOL/Page?handle=hein.journals/gguelr7&div=16&start\\_page=261&collection=journal&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/gguelr7&div=16&start_page=261&collection=journal&set_as_cursor=0&men_tab=srchresults), last accessed on June 2<sup>nd</sup>, 2016.

equipments. They come into contact with the toxic chemicals that are released by the e-wastes on a regular basis and it has a negative impact on the scrap yard workers' health.<sup>6</sup>

Recycling as a solution to the increasing e-wastes too is not much popular due to some inherent barriers. Consumers of e-products are unaware of the recycling programs in their communities and are unwilling to expend the time or energy to store the electronics and transport them to a recycling location. Further electronic items are not easily dismantled and hence the costs associated with recycling makes it unprofitable. Recycling is not considered as an ideal alternative due to the additional expenses that recyclers incur while handling and disposing of hazardous waste such as lead.<sup>7</sup> Therefore, finding an innovative and all-encompassing way to reduce, reuse and recycle electronic products is an urgent necessity to address this 'e-waste crises'.<sup>8</sup>

---

6. Nisha Thakker, *India's Toxic Landfills: A Dumping Ground for the World's Electronic Waste*, available at [http://heinonline.org/HOL/Page?handle=hein.journals/sdlp6&div=83&start\\_page=58&collection=journals&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/sdlp6&div=83&start_page=58&collection=journals&set_as_cursor=0&men_tab=srchresults), last accessed on June 3<sup>rd</sup>, 2016.

7. Kate Gmson and Jessica Kundman Tierney, *Electronic Waste Management, and Disposal Issues and Alternatives*, 18 *Envtl. Cl. J.* 321 (2006), available at [http://heinonline.org/HOL/Page?handle=hein.journals/envcl18&div=32&start\\_page=321&collection=journals&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/envcl18&div=32&start_page=321&collection=journals&set_as_cursor=0&men_tab=srchresults), last accessed on June 2<sup>nd</sup>, 2016.

8. Mary Loung, *Waste 2.0: Updating California's Electronic-Waste Recycling Policies for the Digital Age*, available at [http://heinonline.org/HOL/Page?handle=hein.journals/gguelr7&div=16&start\\_page=261&collection=journals&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/gguelr7&div=16&start_page=261&collection=journals&set_as_cursor=0&men_tab=srchresults), last accessed on June 2<sup>nd</sup>, 2016.

## REFERENCES

- Mondaq and Arya Tripathy, *India: Waste Management In India: an Overview*, available at <http://www.mondaq.com/india/x/396342/Waste+Management/Waste+Management+In+India+An+Overview>, last accessed on June 3<sup>rd</sup>, 2016.
- Kate Gmson And Jessica Kundman Tierney, *Electronic Waste Management, And Disposal Issues And Alternatives*, 18 *Envtl. Cl. J.* 321 2006, available at [http://heinonline.org/HOL/Page?handle=hein.journals/envcl18&div=32&start\\_page=321&collection=journals&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/envcl18&div=32&start_page=321&collection=journals&set_as_cursor=0&men_tab=srchresults), last accessed on June 2<sup>nd</sup>, 2016.
- Mary Loung, *Waste 2.0: Updating California's Electronic-Waste Recycling Policies for the Digital Age*, available at [http://heinonline.org/HOL/Page?handle=hein.journals/gguelr7&div=16&start\\_page=261&collection=journals&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/gguelr7&div=16&start_page=261&collection=journals&set_as_cursor=0&men_tab=srchresults), last accessed on June 2<sup>nd</sup>, 2016.
- Nisha Thakker, *India's Toxic Landfills: A Dumping Ground for the World's Electronic Waste*, available at [http://heinonline.org/HOL/Page?handle=hein.journals/sdlp6&div=83&start\\_page=58&collection=journals&set\\_as\\_cursor=0&men\\_tab=srchresults](http://heinonline.org/HOL/Page?handle=hein.journals/sdlp6&div=83&start_page=58&collection=journals&set_as_cursor=0&men_tab=srchresults), last accessed on June 3<sup>rd</sup>, 2016.
- *The E-waste (Management and Handling) Rules, 2011*, available at [http://www.moef.nic.in/sites/default/files/notified%20ewaste%20rule%202015\\_1\\_0.pdf](http://www.moef.nic.in/sites/default/files/notified%20ewaste%20rule%202015_1_0.pdf), last accessed on June 3<sup>rd</sup>, 2016.