

# Some Aspects of Carbon Trading: Issues and Challenges with reference to India

<sup>1</sup>Sarbapriya Ray, <sup>2</sup>Ishita Aditya Ray

<sup>1</sup>Shyampur Siddheswari Mahavidyalaya, University of Calcutta, Howrah, India.

<sup>2</sup>Bejoy Narayan Mahavidyalaya, Burdwan University, Hooghly, India.

**Abstract:** Issues of global warming have been given a pertinent attention in the recent years and it has become exemplary to reduce the emission levels. The companies in the developed world are required to meet certain carbon emission target set by their respective government. If these companies are not able to meet their emission targets, they have an alternative of purchasing these carbon credits from the market i.e. from someone who is successful in meeting these targets and who has a surplus of these credits. In view of the above discussion, present exercise tries to evaluate pros and cons of the mechanism lying behind carbon trading as developed under the Kyoto Protocol, different aspects of carbon trading including legal, taxation and accounting etc with reference to India. Even though India is the largest beneficiary of carbon trading and carbon credits are traded on the MCX, it still does not have a proper policy for trading of carbons in the market. In order to unleash the true potential of carbon trading in India, it is important that a special statute be created for this purpose as the Indian Contracts Act is not enough to govern the contractual issues relating to carbon credits.

**Keywords:** Carbon Trading; Kyoto Protocol; GreenHouse Gas (GHG) emissions.

## 1. Introduction:

Issues of global warming have been given a pertinent attention in the recent years and it has become exemplary to reduce the emission levels. The companies in the developed world are required to meet certain carbon emission target set by their respective government. If these companies are not capable of meeting their emission targets, they have an alternative of purchasing these carbon credits from the market i.e. from someone who is successful in meeting these targets and who has a surplus of these credits. This process is known as carbon trading. Thus, carbon trading is a commercially viable plan that has been devised to systematically reduce the emission of GHGs that will not force us to change our present lifestyle. Carbon trading is also very advantageous for the companies of the developing world as it provides monetary gains in exchange of carbon credits which help these companies to purchase or change their technology. This change in technology eventually helps the companies to reduce carbon emission. To address the issue of global warming, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992, with the objective of limiting the concentration of Green House Gases (GHGs) in the atmosphere. The initiatives gained momentum with the developed nations (Annex 1 countries) ratifying to the Kyoto Protocol committing themselves to reducing the carbon emission levels by at least 5.2% below the 1990 baseline emission levels by the commitment period of 2008-2012. The prescribed targets under the protocol were not made applicable to the developing or least developed nations. It was like penalizing the developed countries for polluting the environment while spoiling the developing or less developed countries as they were allowed to continue to pollute.

Under the Kyoto Protocol, countries with obligatory emission reduction targets (which presently are

applicable to developed countries) in order to meet the assigned reduction targets are issued allowances (carbon credits) equal to the amount of emissions allowed. An allowance (carbon credit) represents an allowance to emit one metric tonne of carbon dioxide equivalent. To meet the emission reduction targets, binding countries in turn set limits on the GHG emissions by their local businesses and entities.

Since the beginning of Kyoto Protocol in the year 1997, countries all over the world have become more anxious about 'Global Warming'. Industrialized countries are the major contributors to these emissions compared to the developing countries. India being one of the developing countries has ratified the Kyoto Protocol and is emerging as one of the leading Carbon traders under the Clean Development Mechanism (CDM) of Kyoto Protocol. Since India generates enormous amount of Municipal Solid Waste, implementation of CDM project for power generation is extremely viable on investment.

In view of the above discussion, present exercise tries to evaluate pros and cons of the mechanism lying behind carbon trading as developed under the Kyoto Protocol, different aspects of carbon trading including legal, taxation and accounting etc with reference to India.

## 2. Importance of Carbon Trading:

The need for carbon trading has been heavily felt because industries have been the biggest polluter of green house gases which has resulted in global warming. The only way to get the attention of the world towards these problems was by attaching some financial incentive to it. As a result, the concept of Carbon trading was initiated. The *modus operandi* of the 'cap and trade' system is that each year, the governments across the world would be in agreement to yearly carbon emissions limits and the government in turn would be selling permits to the polluters. Consequently, carbon trading has

grown exponentially as carbon emissions entails additional costs and less emission means extra profits besides doing environment some good. It also does not matter who pollutes and who innovates as long as the country is able to maintain the emissions well in the limit. With enlarged economic activity, these carbon allowances would be meager and would not be straightforwardly available as they are in the present times. With the passage of time, the limits provided to the various industries will be reduced, so as they become scarce, those who have a surplus of this would want to sell it to those who are in need of it. The banks are gearing up to do market carbon derivatives contracts that will help companies hedge price risk over the long term also selling carbon-related financial products to outside investors.

Therefore, it can be observed that it is likely that some countries will be able to be a net-sequester of CO<sub>2</sub> while other would be net-emitters. This has resulted in a market developing for trading of CO<sub>2</sub> emissions where 'carbon credits' are sold by net-sequesters to net-emitters. Hypothetically, if a country is incompetent of meeting its target, it can buy credits (or permits) from countries that are under their targets, but if it still falls short, then it is expected that such non-compliance will attract a monetary penalty. The Kyoto Protocol provides for three mechanisms that enable developed countries with quantified emission limitation and reduction commitments to acquire greenhouse gas reduction credits.

These mechanisms are Joint Implementation (JI), Clean Development Mechanism (CDM) and International Emission Trading (IET).

In order to arrange the quota targets set by the Kyoto Protocol with regards to the amount of greenhouse gases that different countries can produce, countries can in turn, set quotas on the emissions of business entities (and individuals). Many countries are considering 'managing' their CO<sub>2</sub> targets through its regulation of business entities and individuals in their own countries in three principle ways:

- Through taxation, the government put into effect a straight tax on CO<sub>2</sub> emissions. The advantage of this is that it is immediately implementable, transparent and similar tax regimes could be harmonised around the globe perhaps under the oversight of the International Monetary Fund. The disadvantage is that business may absorb or pass on the tax to consumers, and not cut emissions (Tounson, 2007).
- By allocating carbon credits or 'permits' to these entities or individuals for the emission of a certain quantity of greenhouse gases in a particular period (i.e. a permitted quota). These permits may be given away free, sold at a predetermined price or auctioned. This is a carbon emission 'rationing' system.
- By approving certain organisations as being able to issue legitimate carbon credits (called 'abatement certificates') by undertaking work to either increase the capacity of sinks, or reduce CO<sub>2</sub> emissions from sources. Known as a cap (or benchmark) and trade system,

greenhouse performance levels are set whereby those that can deliver a particular product with emissions below the benchmark can earn (create) abatement credit certificates. These abatement certificates are then sold to polluters. The pros and cons of carbon credits continue to be debated by the international community, especially as to if they go far enough in solving the problems of global warming. For example, while forests are an important CO<sub>2</sub> sink, there is a limit to the amount of CO<sub>2</sub> that they can store. The largest CO<sub>2</sub> sink is in the fossil fuels in the ground, but we are currently using them as a major source of energy and emitting CO<sub>2</sub> into the atmosphere as a result. It has therefore been argued that, a number of lifestyle changes (from countries, organisations and individuals) are needed to achieve a substantial decrease in emissions. It will require reduced energy demand, increased energy efficiency, using less fossil fuels and more renewable energy sources. It will also require research and development of sustainable technologies that reduce CO<sub>2</sub> emissions.

In theory, businesses and individuals that are over their quotas could buy carbon credits for their excess emissions, while businesses that are below their quotas can sell their remaining credits. By allowing credits to be bought and sold, a business for which reducing its emissions would be expensive or prohibitive can pay another business to make the reduction for it. This minimizes the quota's impact on the business, while still reaching the quota. If all entities and individuals reach or balance their quota, then the country itself can reach its Kyoto Protocol quota, i.e. if permits are only issued to a level equal to or below the assigned amount, then a country should meet its Kyoto commitment (assuming that the measures of its emissions are accurate). Carbon credits thus create a market for reducing greenhouse emissions by giving a monetary value to the cost of polluting the air. This means that carbon becomes a cost of business and is seen like other inputs such as raw materials or labour. As emission levels are predicted to keep rising over time, it is envisaged that the number of companies wanting/needing to buy more credits will increase; hence pushing the market price up, and thus encouraging more groups to undertake environmentally friendly activities which create for them carbon credits to sell. Whilst high CO<sub>2</sub> emitting entities will have an extra cost of running their businesses, there could be money for others who do not, at present, consider CO<sub>2</sub> as a separate line of business, such as foresters and timber companies.

### 3. The Kyoto Protocol

Kyoto Protocol is an agreement made under the United Nations Framework Convention on Climate Change (UNFCCC). The treaty was negotiated in Kyoto, Japan in December 1997, opened for signature on March 16, 1998, and closed on March 15, 1999. The Kyoto Protocol, which came into force and became legally binding on 15<sup>th</sup> February 2005 when Russia ratified the treaty, demands a 5.2% cut in greenhouse gas emissions from the industrialized world as a whole by 2012. India, along with China and Brazil, has emerged as one of its largest beneficiaries in terms of new source of revenue.

This is due to Clean Development Mechanism (CDM), which is perhaps most thrilling feature of the total scheme which allows 'Annex 1 countries' (A total of 41 countries are listed in Annex 1) to meet their emission reduction targets by paying for greenhouse gas emission reduction in non- Annex 1 (developing) countries. Most Annex 1 countries have legally binding greenhouse gas emission reduction requirements under the Kyoto Protocol. These countries, instead of reducing emissions of their own companies, can 'buy' emission reductions in non-Annex 1 countries. Article 12 of the Kyoto Protocol states: "The purpose of the Clean Development Mechanism shall be to assist Parties not included in Annex 1 in achieving sustainable development and in contributing to the ultimate objective of the convention, and to assist Parties included in Annex 1 in achieving compliance with their quantified emission limitation and reduction commitments." India, being a non-Annex 1 country, is naturally one of largest beneficiaries of the Kyoto Protocol. Studies by Crisil and CII estimate the value of the Indian CDM market at more than a billion dollars per annum.

The aim is to lower overall emissions of six greenhouse gases- carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs(Hydrofluoro Carbon), and PFCs - calculated as an average over the five-year period of 2008-12. National targets range from 8% reductions for the European Union and some others to 7% for the US, 6% for Japan, 0% for Russia, and permitted increase of 8% for Australia and 10% for Iceland. Ecologically sustainable development was the theme of discussion at the 'Earth Summit' that was held at Rio de Janeiro, Brazil in the year 1992. This meet laid down the foundation for the next summit that was held in December 1997 at Kyoto, Japan. The resolution, signed by 120 member countries, came to be known as the Kyoto Protocol.

The UNFCCC divides countries into two main groups: A total of 41 industrialized countries are currently listed in the Convention's Annex-I, including the relatively wealthy industrialized countries that were members of the Organization for Economic Co-operation and Development (OECD) in 1992, plus countries with economies in transition (EITs), including the Russian Federation, the Baltic States, and several Central and Eastern European States. The OECD members of Annex-I (not the EITs) are also listed in the Convention's Annex-II. There are currently 24 such Annex-II Parties. All other countries not listed in the Convention's Annexes, mostly the developing countries, are known as non-Annex-I countries. They currently number 145. Annex I countries such as United States of America, United Kingdom, Japan, New Zealand, Canada, Australia, Austria, Spain, France, Germany etc. agree to reduce their emissions (particularly carbon dioxide) to target levels below their 1990 emissions levels. If they cannot do so, they must buy emission credits from developing countries or invest in conservation. Countries like United States of America, United Kingdom, Japan, Newzealand, Canada, Australia, Austria, Spain etc are also included in Annex-II. Developing countries (non-Annex I) such as India, Srilanka, Afghanistan, China, Brazil, Iran, Kenya, Kuwait, Malaysia, Pakistan,

Phillippines, Saudi Arabia, Sigapore, South Africa, UAE etc have no immediate restrictions under the UNFCCC.

It contains a total of 28 articles and was adopted on 11th of December, 1997. According to this Protocol, developed countries (Annex I countries) are required to reduce their GHG emission between 2008 and 2012 to 5.2% below the 1990 level. Developing and Least developed countries (Annex II countries) are not required to reduce their emission for now. United Nations Framework Convention on Climate Change (UNFCCC) looks after the implementation of Kyoto Protocol.

Developed countries (so called annex B countries) that have ratified with the exception of the USA, now face limits on their GHG emissions.

Punitive penalties on non compliance and not reaching targets.

USA is likely to become involved after 2012.

New Zealand agreed to restrict its emissions to 1990 levels, some 309mt tonnes of CO<sub>2</sub> equivalent emissions (its cap) for the 5 year period called the first commitment period (2008-2012).

The 309m units are issued as Assigned Amount Units or AAU's by the United Nations.

Currently emissions are projected to be over 400mt for the same period, hence, there will be a short fall of perhaps 100mt.

Credits are issued for so called Kyoto forests (planted on farmland after 31/12/1989)

Forest credits are expected to make up between 50-70mt of the shortfall leaving approximately 30mt to be sourced from the overseas market.

Renewable energy is exempt.

Developing countries (China, India, Africa, South America, Asia- non Annex B countries) currently don't have emissions caps.

These countries are proposed to be the recipients of investment in new technologies and projects under the 'Clean Development Mechanism' (CDM) of the Kyoto Protocol.

To date over a billion tonnes of GHG emissions have or will be avoided by these projects (so called clean development mechanism or CDM projects)

After verification, these projects are issued Certified Emissions Reductions (CER) by the UN.

The CER units are saleable on the international market and can be used by developed countries (Annex B) to meet their emissions caps (subject to some limits).

## 4. Some connations associated with carbon trading

### 4.1.Greenhouse Gases (GHGs)

The Kyoto Protocol recognized the gases that trap solar radiation and increase the mean sea-level temperature of the Earth causing global warming. These gases are called GHGs. They are Carbon- dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O), Hydro fluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SFI<sub>6</sub>), ozone and even water vapour. Out of these, the first six are to be reduced.

## 4.2. Global Warming

The mean sea-level temperature of the Earth is anticipated to rise by as much as three to four degrees over the previous century. This happens as the GHGs trap the solar radiation that bounces back from the Earth's surface and heats up the atmosphere. This phenomenon is called global warming. This warming will cause the polar ice-caps and mountain glaciers to melt. The enlarged amount of free-flowing water available from melting ice will submerge a large part of low-lying areas of the world and cause heavy rainfall and cyclones in other areas.

## 4.3. Carbon Emission Rights

The crucial point of carbon trading under the scheme envisaged by the Kyoto Protocol can cover a wide range of interests. Carbon credits are rights accruing to a person by reason of the sequestration of carbon from the atmosphere. The sequestration of carbon allows the party enjoying the benefits of sequestration

## 4.4. (CER)/Carbon Credits

Trading of carbon credits takes place in the form of CERs or Certified Emissions Reductions. CERs are in the form of certificates, just like a stock. A CER is given by the CDM Executive Board to projects in developing countries to certify that they have reduced greenhouse gas emissions by one tonne of carbon dioxide per year. This is a type of financial derivative product that derives its value from reduction in emission of GHGs. One CER is equivalent to one tonne of CO<sub>2</sub> emission reduced. Cutting down CO<sub>2</sub> emissions generates CERs. These instruments can be traded at designated markets called Climate Exchanges. The main purpose of the Protocol was to make developed countries pay for their ways with emissions while at the same time monetarily rewarding countries with good behaviour in this regard. Since developing countries can start with clean technologies, they will be rewarded by those stuck with "dirty" ones. This system poises to become a big machine for partially transferring wealth from wealthy, industrialised countries to poor, undeveloped countries. A CER or carbon Credit is defined as the unit related to reduction of 1 tonne of CO<sub>2</sub> emission from the baseline of the project activity.

## 4.5. Carbon Sequestration

With the gradual growth of trees, they suck up carbon dioxide through the process of photosynthesis and store carbon. This is known as carbon sequestration. This helps to reduce carbon dioxide concentrations in the atmosphere and is permitted under Article 3.3 of the Protocol to help countries meet their target commitments. The carbon credits generated from sequestered carbon could be traded in an emissions trading market.

## 4.6. Carbon Trading Mechanism:

Thirty-eight developed countries of the world produce about seventy percent of total GHG emissions while a

large number of developing and least-developed countries generate the rest. Since the responsibility is on developed countries to reduce GHG emissions in the first phase, they have to upgrade their production process and spend billions of dollars to achieve the target. Developed countries are required to spend approximately \$300-\$500 to reduce a tonne of CO<sub>2</sub> emission compared to just \$10-\$25 required by a developing country. Also this change-over process would shut down their factories for days. In the highly competitive business world, companies cannot afford either of the options. The only way out for them is to purchase CERs generated by another company. There are three mechanisms developed under the Kyoto Protocol. They are – (i) Joint Implementation (JI), (ii) Clean Development Mechanism (CDM) and (iii) International Emission Trading (IET).

### • Joint Implementation (JI)

Joint implementation is one of the mechanisms of the Kyoto Protocol which allows industrialised countries with a greenhouse gas reduction commitment (so-called Annex I countries) to invest in emission reducing projects in another industrialised country as an alternative to emission reductions in their own countries. As costs of emission reductions are significantly lower in some countries, countries with relatively high costs for emission reductions can reduce costs of complying with their Kyoto targets by using credits from JI projects.

Under JI, a developed country with high production cost can set up a GHG-reducing project in a low-cost developed country. Joint Implementation projects are expected to take place in 'Economies in Transition', where there are caps set in for emissions. Emission reductions are awarded as Emission Reduction Units (ERUs) which come from the host country's pool of assigned emission credits known as Assigned Amount Units (AAUs). In JIs, the total amount of emission credits does not change, whereas CDM projects must provide for additional emission reductions to what it would otherwise have occurred. The Joint Implementation projects are supervised by the Joint Implementation Supervisory Committee (JISC).

### • Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM), defined in Article 12 of the Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. The Clean Development Mechanism (CDM) enables developing countries to participate in joint greenhouse gas (GHG) mitigation projects. Under this Protocol, Annex I countries (developed countries and economies in transition) are required to reduce GHG emissions to below their 1990 levels. It allows public or private sector entities in Annex I countries to invest in GHG mitigation projects in developing countries. In return the investing parties receive credits or certified emission reductions (CERs), which they can use to meet their targets under the Kyoto Protocol.

While investors make profit from CDM projects by obtaining reductions at costs lower than in their own countries, the gains to the developing country host parties are in the form of finance, technology, and sustainable development benefits.

India too is moderately bullish on the carbon trade markets. It is estimated that one third of the total CDM projects registered with UNFCCC are from India and India claims 31% of the total world carbon credit trade. As per a CRISIL research report issued in May, 2010, carbon credits generated out from emission reduction projects undertaken in India will triple over next three years and the numbers are expected to increase from 72 million in November 2009 to 246 million by December 2012.

Though several CDM projects are being undertaken in India, but there remains a lot of ambiguity with regard to legal, regulatory, accounting and taxation issues. For instance, several countries are treating carbon credits as services for taxation, in some countries for accounting purposes, carbon credits are treated as government grants, accounting for R& D expenses incurred on undertaking the CDM project etc. In India too, Bangalore Chamber of Commerce and Industry has mentioned that carbon credits should be treated as 'services' and taxed accordingly. The rationale behind this opinion is that either CERs are exported to developed countries or are traded like securities on the stock exchanges, hence attracting service tax, however the recent DVAT notification has clarified the matter.

- Carbon emissions trading

Carbon emissions trading will come about only if a *cap-and-trade* scheme (also known as a *Pollution-based carbon market*) is established in a country. If companies produce CO<sub>2</sub> less than the cap, they have surplus credits for sale. If they emit more than their cap, they can buy credits from other businesses that come in under their cap (the trade). Trade takes place in an over the counter market, or via a Carbon Credit Exchange trading market. In terms of the 'cap', it has been suggested that initially the quotas given by governments should be liberal, which would make the demand for carbon credits, and their resulting price, low so that business find it easy to transition towards paying for credits. Then over time, the quota of emissions a government sets (based on, say, international agreements) will gradually be reduced until the target level of emissions is reached. A cap-and-trade system should ideally be based on free-market principles whereby those best placed to reduce their emissions can reduce emissions for those less well placed and then sell these reductions. Due to the possibility of trading, carbon credits are poised to emerge as the world's hottest, yet least understood commodity.

## 5. Some aspects in carbon trading

### 5.1 Legal aspect of Carbon Trading in India

The Multi Commodity exchange commenced future trading on January, 2008 after Government of India recognized carbon credit as commodities on 4th January. The National Commodity and Derivative Exchange by a

notification and with due approval from Forward Market Commission (FMC) launched Carbon Credit future contract whose aim was to provide transparency to markets and help the producers to earn remuneration out of the environment projects.

Carbon credit in India is traded on NCDEX only as a future contract. Futures contract is a standardized contract between two parties to buy or sell a specified asset of standardized quantity and quality at a specified future date at a price agreed today (the futures price). The contracts are traded on a future exchange. These types of contracts are only applicable to goods which are in the form of movable property other than actionable claims, money and securities. Forward contracts in India are governed by the Indian Contract Act, 1872.

Under the present provision of the Forward Contracts Regulation Act, the trading of forward contracts will be considered as void as no physical delivery is issued against these contracts. To rectify these inconveniences, the Forward Contracts (Regulation) Amendment Bill, 2006 was introduced in the Indian Parliament. The Union Cabinet on January 25, 2008 approved the ordinance for amending the Forward Contracts (Regulation) Act, 1952. This ordinance has to be passed by the Parliament and is expected to come up for consideration this year. This Bill also amends the definition of 'forward contract' to include 'commodity derivatives'. Currently the definition only covers 'goods' that are physically deliverable. However a government notification on January 4th paved the way for future trading in CER by bringing carbon credit under the tradable commodities.

The government of Delhi in a recent notification has declared that the Certified Emission Reductions (or 'Carbon Credits') are to be considered as goods and thus their sale is liable to value added tax in the State. The Commissioner of Trade and Taxes has declared that the nature and aspects of Carbon credits have to be examined and tested against the definition of goods to arrive at the conclusion that carbon credit are no different from ordinary commodities bought and sold in the market and thus a sale transaction of carbon credit would attract value added tax on sale.

Even though India is the largest beneficiary of carbon trading and carbon credits are traded on the MCX, it still does not have a proper policy for trading of carbons in the market. As a result the Centre has been asked by The National Commodity and Derivatives Exchange Limited (NCDEX) to put in place a proper policy framework for allowing trading of certified emission reductions (CERs), carbon credit, in the market. Also, India has huge number of carbon credits sellers but under the present Indian law, the buyers based in European market are not permitted to enter the market. To increase the market for carbon trading Forward Contracts (Regulation) Amendment Bill has been introduced in the Parliament. This amendment would also help the traders and farmers to utilize NCDEX as a platform for trading of carbon credits. However, to unleash the true potential of carbon trading in India, it is important that a special statute be created for this purpose as the Indian Contracts Act is not enough to govern the contractual issues relating to carbon credits.

### 5.2 Taxation Issues

The principle on which a carbon tax system operates is that the cost of producing goods and services which are emissions-intensive increases due to the carbon tax, and hence the consumption of those particular goods and encourages industries to produce goods and services which are less emissions-intensive by taking alternative manufacturing pathways. The alteration of manufacturing behaviour is one pathway which avoids raising the price of goods and services significantly.

The carbon tax would arguably continue to increase until evidence existed that a reduction in emissions was occurring and indeed had fallen to the desired level. Economists such as Gittins note that a carbon tax: is intended to discourage the consumption of [emissions-intensive] goods and services, while also providing producers with an incentive to find ways of reducing the amount of emissions generated by their production process.[ Ross Gittins, 'Economists fiddle while climate burns', The Sydney Morning Herald (Sydney) 14 March 2009, 5.]

Income from sale of CERs should be accounted for under the head Business & Profession and in case of sale of Intangible, it would be taxable under the head Capital Gains though most companies in India are recording earnings from carbon credit trading as Income from Other Sources. Trading in CER is carried out either in spot market or in futures. Service tax will be applicable on account of dealing in CERs on the exchange platform and in case of contracts resulting in delivery VAT will be applicable.

Typically, carbon credits in India are sold to overseas buyers, hence there would be no VAT applicable on these goods. Thus, sale of CERs to overseas buyers should qualify as exports, however there is no explicit mention made in this regard by the concerned authorities. CER credits are indeed intangible assets, held with registry. CER credits acquired from other parties for the purposes of trading are recognised in the books at the cost of acquisition, whereas self-generated CER credits are not reflected in financial accounts. As issues for accounting of CER credits will appear for the first time in Financial Year 2006-07, it's important to disclose the accounting policy adopted for this purpose. It would be appropriate to disclose units of CER held with registry in notes bi-furcating between purchased and self-generated. As CERs are capital assets, tax liability should be admitted under the head Capital Gain, and claim for concessional rate of taxation should also be made if credit is held for more than 36 months immediately preceding the date of transfer. This gives an opportunity to take a decision about timings of sale of such credits, keeping a balance between cash flow needs, interest factor and difference in rate of tax between long-term and short-term holdings. As there would be no cost of acquisition for self-generated CER credits, section 55(2) of the Income Tax Act will come into operation, and total sale consideration will be liable for Capital Gains Tax (long term/short term) according to the period of holding. In Indian circumstances, if sale of CER credits happen to overseas buyers, of the property held overseas, such sale, though sale of 'goods', will not attract any sales tax.

### 5.3 Accounting issues :

India is one of the key players in the global market on the supply side of CERs. Indian companies have started getting credit of CERs and some of them have also entered into sale arrangement with buyers in the international market. As this is a new concept, it has given rise to interesting financial accounting dimensions. Issues involved are (i) how to account for expenditure on CDM projects, (ii) whether or not to account for self-generated CERs held with registry, (iii) if credits are to be accounted, at what point of time these should be recognized in books of accounts and at what value, and (iv) how to account for sale consideration of CERs and its disclosure in accounts and notes. Answers to these questions are found within existing pronouncements of ICAI as well as Schedule VI requirements. Taxation issues will naturally follow.

Developing a CDM project should not be observed as a commercial transaction. It is not a massive business but simply a profitable way of making business environmentally conscious. A CDM project cannot be undertaken only on the basis of generation of expected CERs points and its market value. To be sustainable, the project must be financially sound by itself. There are several benefits of undertaking CDM projects, starting from reduced energy bills by using energy-efficient equipment, additional depreciation on capital equipments installed for CDM projects, reduced regulatory oversight, image of a responsible corporate citizen, advance preparation for such time when India will be given targets to reduce greenhouse gas emissions on its own account, and so on. The availability of a mechanism of recognition of carbon credits and its marketability provides additional revenues, and makes businesses more competitive in the global market. As of now, there are no separate Indian accounting standards to measure income and expenditure from carbon reducing projects. The existing standards can well account for new capital investments, its depreciation, recurring costs and sale proceeds of CERs. Some experts feel that CDM projects should be accounted for as a separate segment under AS-17 (segment reporting). This line of thought does not appear practical if the concept of 'journey, not destination' is properly followed. A CDM project cannot be a profit centre or cost centre in itself. In a multi-segment industry, any CDM project can be identified with its parent segment.

### 5.4 CERs as Goods:

The notification issued by the Government of the National Capital Territory of Delhi, notifying the legal position with regard to the taxability of CER has raised several questions as to whether carbon credits are to be treated as "goods" and whether it is eligible to tax and that they cannot be considered as *actionable claims or securities*. The Notification explains that in substance, CERs are tradable commodity. They have a market value, having a ready market, with willing buyers and sellers and are freely transferable as other marketable commodities. Thus carbon credits should be considered to be goods under the sales tax laws and any person/

company/ undertaking/ entity engaged in the activity of sale or purchase of carbon credits is a “dealer” in terms of the definition of dealer as contained in Section 2(1) of the DVAT Act, 2004. The notification further explains that under section 2(1)(m) of the DVAT Act, 2004, “goods” has been defined as

*“goods” means every kind of moveable property (other than newspapers, actionable claims, stocks, shares and securities) and includes -*

*(i) livestock, all material, commodities, grass or things attached to or forming part of the earth which are agreed to be served before sale or under a contract of sale; and (ii) property in goods (whether as goods or in some other form) involved in the execution of a works contract, lease or hire-purchase or those to be used in the fitting out, improvement or repair of movable property”.*

To draw conclusion, reliance was placed on several judgments of the Hon’ble Supreme Court in the matter of *H. Anraj v. Government of Tamil Nadu*, [1986] 1 SCC 414, *Vikas Sales Corporation & Another vs Commissioner of Commercial Taxes & Another* JT 1996 (5) SC 482, *Yash Overseas Vs. Commissioner of Sales Tax and Others* (Civil Appeal No.2155 of 2000), *M/s.Sunrise Associates vs. Govt. of NCT of Delhi & Ors.* (Judgment dated 28.4.2006) and so on.

The Notification No. 256/CDVAT/2009/43 dated 13.01.2010 issued by the Government of the National Capital Territory of Delhi, concluded that Certified Emission Rights (Carbon Credits) are taxable under DVAT Act, 2004 and the rate applicable is 4% as the said item is covered under Entry No.3 of IIIrd Schedule appended to the DVAT Act, 2004.

CER credits are considered goods, as they have all the attributes thereof. As held by the apex court in *TATA Consultancy Services v. State of Andhra Pradesh [2004] Taxman 132/ 271 ITR 401*, while dealing with issue of levy of sales tax on computer software, “a ‘goods’ may be a tangible property or an intangible one. It would become goods provided it has the attributes thereof having regard to (a) its utility; (b) capability of being bought and sold; and (c) capability of being transmitted, transferred, delivered, stored and possessed.” This approach was reiterated by the apex court in *BSNL v. UOI [2006] 152 Taxman 135/ 282 ITR 273/ 145 STC*.

Business community in India has started seeing value in undertaking carbon accounting and reporting it in public forums. Such forums include Carbon Disclosure Project (CDP) and company's Sustainable Development Reports. The number of companies which responded the CDP's information request on climate change strategy, risk and opportunities assessment and carbon accounting was answered by 37 companies in 2007. The number increased to 51 in 2008 and dropped marginally to 44 in 2009, partially explained by the global financial crisis. There is still long way to go for Indian businesses on the path of carbon accounting and disclosures. Even in the top 200 firms in India (by market capitalization), the response rate in last few years has steadily increased and reached 20%, a rather dismal performance compared to developed markets.

In the following discussion, we summarize the key issues that would become increasingly relevant to Indian organizations and drive thorough and wide spread carbon accounting, reduction and disclosure efforts.

Generation and trading in carbon credits has gained a lot of momentum but there remains a lot of ambiguity for the accounting treatment to be rendered. Questions on accounting for expenditure on the CDM projects, accounting for self generated CERs, accounting for sale consideration and so on. The answers are to be sought in the existing accounting standards as there are no separate accounting standards for accounting, measurement and disclosures of carbon credits. Some of the countries suggest recognition of carbon credits as government grant, however this approach would be inappropriate as government grants are received by an organization on concessional or nominal rates or free of cost, wherein government would grant or allocate some concessional benefit to an entity. In case of CERs, it is not any benefit that is provided by government or any affiliated authority, it is an incentive provided to entities for doing good to the environment. To resolve the accounting issues, International Accounting Standards Board (IASB) had issued an interpretation IFRIC 3 on Emission Rights but had later withdrawn the same, continuing to debate on the appropriate treatment for CERs. The Accounting Standard Board of the Institute of Chartered Accountants of India (ICAI) has also issued an Exposure Draft of the Guidance Note on Accounting for Self-generated Certified Emission Reductions in 2009 enumerating the accounting principles for CERs generated by an entity. The exposure draft provides for accounting principles relating to recognition, measurement and disclosures of CERs generated under the Clean Development Mechanism. Clean Development Mechanism being the relevant mechanism adopted in India for reduction in carbon emissions, it is pertinent to mention that in a CDM mechanism, a developed nation may invest in a project in developing nation, which would result in emission reduction. The emission reductions once certified by the CDM Executive Board, under the protocol are called certified Emission reductions (CERs) or carbon credits and are used to meet nation's commitments under the Protocol. While undertaking a CDM project an entity has to go through a lot of research and development, documentation and approvals process. Accounting treatment for CERs taking in consideration the exposure draft issued by ICAI should be done in the following manner:

(i). Expenses in the research and development phase:

While undertaking the project for reduction in carbon emission, any cost incurred on development should be accounted for as enumerated in AS 26 for intangible assets. Cost incurred on receiving the CER is measured with certainty at the time of incurring those expenses whereas revenue recognition will happen only at the time of sale of CERs. So there is a mismatch of in accounting for expenses and revenue.

(ii). CERs held with the CDM Executive Board

The exposure draft on guidance note on accounting for carbon credits states that when the CERs are in the approval stage, these should be accounted for as per the provisions of AS 29 as Contingent Assets and once approved should be recorded in the books as an intangible asset. There is an anomaly in the drafting as Para 30 of AS 29 says that an enterprise should not recognize a contingent asset. However, once the CER are approved by the Board, these should be recorded as intangible assets under AS 26 as they meet te criteria of 'Intangible Assets' as defined in the Standard, which includes 1) identifiability, 2) control over resources and 3) expectation of future economic benefits flowing to the enterprise.

(iii). CERs held for sale:

In case an enterprise possess CER which are to be traded in the ordinary course of business, i.e, the enterprise holds the asset as 'available for sale' then, these should be accounted for as Inventory under provisions of AS 2. Para 8 of the AS 26 states that if any item under this standard does not meet the definition of intangible assets, then the expenditure to acquire it or generate it is internally recognized as an expense when it is incurred The intent of the entity would determine whether these credits should be recorded as intangible assets or as inventory. There are further questions on CERs that at what cost should CERs be recorded in the books, as huge amount of expenditure is incurred in terms of initializing the project, emission of reduction, approval and acceptance of CERs etc. The exposure draft of the guidance note clearly indicates that in case intangible asset is generated, expenses are to be capitalized as per AS 26, whereas in case CERs treated as inventory, costs relating to consultant fees, levies imposed by UNFCCC for approving of CERs are to be inventorised and are to be recorded as lower of cost or net realizable value as per the standard. This means that the cost towards certification is the cost of inventory. What is worthy of taking note here is that the cost that is inventorised is only a small and insignificant portion of the expenditure incurred, whereas the other incidental cost taken to the profit & loss account would be far more significant, thus deflating by profits. Any other tangible or intangible asset generated in the process is to be recorded as per the existing accounting standard governing them, i.e AS 10 and AS 26 respectively.

Self-generated CERs held with registry cannot be included in Inventories as defined in Accounting Standard-2, as they are not held for sale in the ordinary course of business. On the other hand, such credits meet all the criteria of 'Intangible Asset' as defined in Accounting Standard-26 i.e. (i) identifiability, (ii) control over a resource, and (iii) expectation of future economic benefits flowing to the enterprise. Para 19 to 23 of Accounting Standard-26 deal with recognition and initial measurement of an intangible asset. Para 20, which is the operating portion of this section, provides that an intangible asset should be recognised if, and only if: (a) it is probable that future economic benefits attributable to the asset will flow to the enterprise; and (b) the cost of asset can be measured reliably. Since we have already

demonstrated that availability of CER credits is only an additional benefit of a CDM project, it would be impossible to measure the cost of self-generated CER asset reliably. Thus it can be concluded that though self-generated CERs held with registry are Assets (Intangible), they cannot be recognized in Accounts due to specific requirements of Accounting Standard-26.

(iv)CER Sale is Other Income, Not Turnover:

We can safely conclude from the discussion above that sale proceeds of CER credits cannot be included in Turnover. Section 43A(11) of the Companies Act, 1956, defines 'Turnover' as "the aggregate value of the realisation made from the sale, supply or distribution of goods or on account of services rendered, or both". Part II of Schedule VI to the Companies Act, 1956, requires a separate disclosure of "profits or losses in respect of transactions of a kind, not usually undertaken by the company or undertaken in circumstances of an exceptional or non-recurring nature, if material in amount".

Though CERs are goods, their sale is undertaken, if not in exceptional circumstances, certainly on non-recurring basis. We have already seen that a CDM project cannot be a profit/cost centre in itself, and, therefore, it is neither possible nor desirable to attempt to work out separate profit or loss of any CDM project, with an accuracy expected from accountants. A combined reading of Section 43A and Schedule VI of the Companies Act clearly establishes that sale proceeds of CERs should be disclosed as a line item in schedule of other income, if amount is material.

(v)Revenue Recognition on Sale of CER Credits:

As we have already concluded that CER credits are goods, their sales proceeds have to be recognised in financial accounts as per para.11 of the Accounting Standard 9 ('revenue recognition'). The conditions of para.11 are self-explanatory, and are reproduced below: "11. In a transaction involving the sale of goods, performance should be regarded as being achieved when the following conditions have been fulfilled

(i) the seller of goods has transferred to the buyer the property in the goods for a price or all significant risks and rewards of ownership have been transferred to the buyer and the seller retains no effective control of the goods transferred to a degree usually associated with ownership; and (ii) no significant uncertainty exists regarding the amount of the consideration that will be derived from the sale of the goods."

(vi)Self-generated CERs held with Registry: Accounting Carbon Credits as per AS- 12:

Some experts, having admitted that there are presently no guidelines/standards for accounting of Carbon Credits, have suggested that they be accounted as Government Grant. There logic is based on the definition of the term 'Government' prescribed in para 3.1 of AS-12, which reads: "Government refers to government, government

agencies and similar bodies, whether local, national or international.” The logic forwarded appears to be misplaced, as in case of financial transactions arising out of carbon credit, monetary consideration will not flow from any government or government agency. In total strategy, UNFCCC CDM registry acts as a Demat banker recognising CER credits and keeping an account of it. There is no grant at all from any agency. Further, as soon as Carbon Credits are accounted as Government Grants, Accounting Standard-9 ‘revenue recognition’ will cease to operate, leading to other accounting and taxation complications.

## 6. Carbon Trading in India :

India signed and ratified the Protocol in August, 2002. Since India is exempted from the framework of the treaty, it is expected to gain from the protocol in terms of transfer of technology and related foreign investments. At the G-8 meeting in June 2005, Indian Prime Minister Manmohan Singh pointed out that the per-capita emission rates of the developing countries are a small fraction of those in the developed world. Following the principle of *common but differentiated responsibility*, India maintains that the major responsibility of curbing emission rests with the developed countries, which have accumulated emissions over a long period of time.

Carbon trading allows industries in developed countries to offset their emissions of carbon dioxide by investing in reforestation and clean energy projects in developing countries. Carbon projects could potentially recover habitat on millions of hectares of heavily populated forest and farmlands. "This would bring social, economic, and local environmental benefits to hundreds of thousands, and potentially millions, of poor rural people in the developing world," (David Kaimowitz, Director General of CIFOR, 2002).

Indian industries were able to cash in on the sudden boom in the carbon market making it a preferred location for carbon credit buyers. It is expected that India will gain at least \$5 billion to \$10 billion from carbon trading (Rs 22,500 crore to Rs 45,000 crore) over a period of time. Also India is one of the largest beneficiaries of the total world carbon trade through the Clean Development Mechanism claiming about 31 per cent (CDM).

India's carbon market is one of the fastest growing markets in the world and has already generated approximately 30 million carbon credits, the second highest transacted volumes in the world. The carbon trading market in India is growing faster than even information technology, bio technology and BPO sectors. Nearly 850 projects with an investment of Rs 650,000 million are in the pipeline. Carbon is also now being traded on India's Multi Commodity Exchange. It is the first exchange in Asia to trade carbon credits.

India comes under the third category of signatories to UNFCCC. India signed and ratified the Protocol in August, 2002 and has emerged as a world leader in reduction of greenhouse gases by adopting Clean Development Mechanisms (CDMs) in the past few years. According to Report on National Action Plan for

operationalising Clean Development Mechanism(CDM) by Planning Commission, Govt. of India, the total CO<sub>2</sub>-equivalent emissions in 1990 were 10, 01, 352 Gg (Gigagrams), which was approximately 3% of global emissions. If India can capture a 10% share of the global CDM market, annual CER revenues to the country could range from US\$ 10 million to 300 million (assuming that CDM is used to meet 10-50% of the global demand for GHG emission reduction of roughly 1 billion tonnes CO<sub>2</sub>, and prices range from US\$ 3.5-5.5 per tonne of CO<sub>2</sub>). As the deadline for meeting the Kyoto Protocol targets draws nearer, prices can be expected to rise, as countries/companies save carbon credits to meet strict targets in the future. India is well ahead in establishing a full-fledged system in operationalising CDM, through the Designated National Authority (DNA). Other than Industries and transportation, the major sources of GHG's emission in India are as follows:

- Paddy fields
- Enteric fermentation from cattle and buffaloes
- Municipal Solid Waste

Of the above three sources the emissions from the paddy fields can be reduced through special irrigation strategy and appropriate choice of cultivars; whereas enteric fermentation emission can also be reduced through proper feed management. In recent days the third source of emission i.e. Municipal Solid Waste Dumping Grounds are emerging as a potential CDM activity despite being provided least attention till date.

- As a welcome scenario, India now has two Commodity exchanges trading in Carbon Credits. This means that Indian Companies can now get a better trading platform and price for CERs generated.
- Multi Commodity Exchange (MCX), India's largest commodity exchange, has launched futures trading in carbon credits. The initiative makes it Asia's first-ever commodity exchange and among the select few along with the Chicago Climate Exchange (CCE) and the European Climate Exchange to offer trades in carbon credits. The Indian exchange also expects its tie-up with CCX which will enable Indian firms to get better prices for their carbon credits and better integrate the Indian market with the global markets to foster best practices in emissions trading.
- On 11th April 2008, National Commodity and Derivatives Exchange (NCDEX) also has started futures contract in Carbon Trading for delivery in December 2008.
- MCX is the futures exchange. People here are getting price signals for the carbon for the delivery in next five years. The exchange is only for Indians and Indian companies. Every year, in the month of December, the contract expires and at that time people who have bought or sold carbon will have to give or take delivery. They can fulfill the deal prior to December too, but most people will wait until December because that is the time to meet the norms in Europe. If the Indian buyer thinks that the current price is low for him he will wait before selling his credits. The Indian government has not fixed any norms nor has it made it compulsory to reduce

carbon emissions to a certain level. So, people who are coming to buy from Indians who are actually financial investors. They are thinking that if the Europeans are unable to meet their target of reducing the emission levels by 2009, 2010 or 2012, then the demand for the carbon will increase and then they may make more money. So investors are willing to buy now to sell later. There is a huge requirement of carbon credits in Europe before 2012. Only those Indian companies that meet the UNFCCC norms and take up new technologies will be entitled to sell carbon credits. There are parameters set and detailed audit is done before you get the entitlement to sell the credit.

### **Some examples of Carbon trading in India:**

#### **Jindal Vijaynagar Steel:**

The Jindal Vijaynagar Steel has recently declared that by the next ten years it will be ready to sell \$225 million worth of saved carbon. This was made possible since their steel plant uses the Corex furnace technology which prevents 15 million tonnes of carbon from being discharged into the atmosphere.

#### **Power guda in Andhra Pradesh**

The village in Andhra Pradesh was selling 147 tonnes equivalent of saved carbon dioxide credits. The company has made a claim of having saved 147 MT of CO<sub>2</sub>. This was done by extracting bio-diesel from 4500 Pongamia trees in their village.

#### **Handia Forest in Madhya Pradesh**

In Madhya Pradesh, it is estimated that 95 very poor rural villages would jointly earn at least US\$300,000 every year from carbon payments by restoring 10,000 hectares of degraded community forests.

India being a developing country has no emission targets to be followed. However, she can enter into CDM projects. As mentioned earlier, industries like cement, steel, power, textile, fertilizer etc emit green houses gases as an outcome of burning fossil fuels. Companies investing in Windmill, Bio-gas, Bio-diesel, and Co-generation are the ones that will generate Carbon Credits for selling to developed nations. Polluting industries, which are trying to reduce emissions and in turn earn carbon credits and make money include steel, power generation, cement, fertilizers, waste disposal units, plantation companies, sugar companies, chemical plants and municipal corporations.

Carbon Credits projects requires huge capital investment. Realizing the importance of carbon credits in India,

The World Bank has entered into an agreement with Infrastructure Development Finance Company (IDFC), wherein IDFC will handle carbon finance operations in the country for various carbon finance facilities.

The agreement initially earmarks a \$10-million aid in World Bank-managed carbon finance to IDFC-financed projects that meet all the required eligibility and due diligence standards.

IDBI has set up a dedicated Carbon Credit desk, which provides all the services in the area of Clean Development Mechanism/Carbon Credit (CDM).

In order to achieve this objective, IDBI has entered into formal arrangements with multi-lateral agencies and buyers of carbon credits like IFC, Washington, KfW, Germany and Sumitomo Corporation, Japan and reputed domestic technical experts like MITCON.

HDFC Bank has signed an agreement with Cantor CO<sub>2</sub>E India Pvt Ltd and MITCON Consultancy Services Limited (MITCON) for providing carbon credit services. As part of the agreement, HDFC Bank will work with the two companies on awareness building, identifying and registering Clean Development Mechanism (CDM) and facilitating the buy or sell of carbon credits in the global market.

## **7. Conclusion**

The Indian market is extremely receptive to Clean Development Mechanism (CDM). Having cornered more than half of the global total in tradable certified emission reduction (CERs), India's dominance in carbon trading under the clean development mechanism (CDM) of the UN Convention on Climate Change (UNFCCC) is beginning to influence business dynamics in the country. Even though India is the largest beneficiary of carbon trading and carbon credits are traded on the MCX, it still does not have a proper policy for trading of carbons in the market. As a result the Centre has been asked by The National Commodity and Derivatives Exchange Limited (NCDEX) to put in place a proper policy framework for allowing trading of certified emission reductions (CERs), carbon credit, in the market. Also, India has huge number of carbon credits sellers but under the present Indian law, the buyers based in European market are not permitted to enter the market. Economists have been trying to assess the net benefit of Kyoto Protocol through cost benefit analysis. As in the case of climatology, there is disagreement due to large uncertainties in economic variables. Still the estimate generally indicate that either observing this protocol will be more expensive than not observing or it will have marginal net benefit which will exceed the cost of adjusting to global warming.

A great deal of analytical work is still required to fully define how the markets will work, the transaction costs, and the discounts due to factors such as uncertainty and non-permanence. Currently the scientific understanding of Carbon sequestration is ahead of the economic analyses, and it remains an international challenge to combine science with good economic analysis to determine policies which will work for the environment and people here.

Opening up the possibility to obtain credit for trading through Joint implementation (JI) and Clean Development Mechanism (CDM) would likely backfire in terms of sustainability and equity. On the other hand, CDM can be treated as a way to meet the concern of the FCCC that annex-I countries should assist developing countries financially and technologically in dealing with climate change. A way of this dilemma could be to strictly focus the CDM on assisting non-annex-I countries in the transition to a non carbon economy (Agarwal/Narayan,2000).

Moreover, to extract the true potential of carbon trading in India, it is important that a special statute be

created for this purpose as the Indian Contracts Act is not sufficient to govern the contractual issues relating to carbon credits.

### References:

- [1] Agarwal, A and Narain,S (2000), How poor nations can help to save the world, In: Munasinghe M/ Swart R(eds), Climate change and its linkage with development,equity and sustainability; Geneva:IPCC,191-214.
- [2] Bhatia, Jatinder.S. and Harsh Bhargava.(2006).'Global Warming and Clean Development Mechanism Projects: State and Trends in India', The ICFAI Journal of Environmental Economics,4(3):71-81.
- [3] Jacob Werksman (1998), 'The Clean Development Mechanism: Unwrapping the "Kyoto Surprise"', Review of European Community and International Environmental Law 7( 2): 147-158.
- [4] Kyoto protocol status(pdf).UNFCCC.Retrieved on 2006-11-07.
- [5] Kyoto Protocol: Status of Ratification, 10 July 2006 (PDF). UNFCCC. Retrieved on October 30, 2006.
- [6] McDowell, N(2002),Developing countries to gain from carbon-trading fund. Nature 420:4.
- [7] Taunson ,A(2007),Exxon, Greens in carbon Concensus,Weekend Australian Business,March,24-25,p36.
- [8] UNFCCC, 1992. United Nations Framework Convention on Climate Change. Convention on Climate Change. <http://www.unfccc.de/resource/conv/index.html>
- [9] UNFCCC, 1997. Kyoto Protocol to the United Nations Framework Convention on Climate Change. <http://www.unfccc.int/>
- [10] UNFCCC, 1998. Kyoto Protocol to the United Nations Framework Convention on Climate Change (with addendum). Document FCCC/CP/1997/7/Add.1. <http://www.unfccc.de/resource/docs/convkp/kpeng.pdf>.
- [11] Yuvika Gupta(2011), Carbon Credit: A Step Towards Green Environment, Global Journal of Management and Business Research Volume 11 Issue 5 Version 1.0 ,pp17-19.
- [12] From Editor's Desk, National Solid Waste Association of India (NSWAI) ENVIS • The Ministry of Environment & Forests, Government of India, New Delhi Seventh Issue – February.,2007.

