

## CHAPTER 7

# Market Failures and Public Policy Interventions

In a market economy, goods and services are produced at a cost by the producer and sold to the consumer for a price. The good normally uses up resources such as raw material, labor, and technology, and they are all paid for. When the buyer buys the good, he or she pays the price to transfer the property right to himself or herself. Markets, therefore, function on the basis of prices and costs and are based on the concept of private property. Sometimes, in the making of a good, a by-product or waste may be created, which has adverse effects on people who are neither the producers nor consumers of the good. This third person, or society at large, has to pay a cost to mitigate the effect of the by-product, for example, toxic waste or a greenhouse gas. As a result of producing and consuming a *good*, society has to incur the cost of the pollutant, or a *bad* (opposite of good). We say the market fails in such a situation because the sum of the benefits that the producer and consumer derive does not account for the costs incurred by the affected third parties or society. On the other hand, there are instances of goods that are usually naturally available in abundance, which are owned by everybody and no private property rights exist, for instance, the air we breathe or the high seas. In such situations, there is no market for these goods defined by costs and prices, and there is a tendency to overuse the good, and hence leads to congestion or deterioration of the usefulness of the good. Both these situations create environmental stress. For instance, increased pollution in the first case and overfishing in the oceans in the second lead to such stress. Economists have developed a framework for correcting the failure of the market; in the first case to internalize total costs into the transaction, and the absence of property rights and markets in the latter case.

When markets are allowed to function by themselves without any governmental interventions but do not maximize social welfare,<sup>1</sup> they are said to *fail*. The failure could be due to several causes. It could be due to market power, that is, situations of monopoly or oligopoly-like market structures where prices charged are higher than the additional costs of production. Alternatively, market failure could result from situations where the market price does not adequately convey the actual costs of production or actual benefits from consumption, referred to as externalities. The former is a situation of a negative externality, and the latter that of a positive externality. Thirdly, market failure (or even the absence of markets) could result in situations when the good in question (say clean air) is non-excludable and non-rival in nature, which makes it difficult to extract value from people who consume the good. Fourth, information asymmetry and inadequacy of institutional support could be causes of market failure. For example, for a complete and well-functioning market to develop for electric cars, there is a need to have a network of charging points, which, if left to private players, could be grossly inadequate. The *network effects* could also be interpreted as positive externalities. In the sections that follow, we discuss externalities as market and institutional failures. We, then, discuss policy interventions to correct them and the challenges faced in implementing these.

## Externalities: Effects and Policy Interventions

An externality arises when the prices, which are a result of the interaction of market demand and supply, do not adequately convey the actual impact of actions of either the producer or the consumer. A negative externality would arise when the costs of production do not take into account certain additional costs of production, because these do not have to be borne by the producer. Pollution from production of goods is an example; while the producer bears the cost of production, the costs of pollution

<sup>1</sup> This could be interpreted as the sum of the producer and consumer surpluses arising from arriving at an equilibrium price when the market functions perfectly. Consumer surplus is the difference between the total amount that consumers are willing and able to pay for a good or service and the total amount that they actually do. Producer surplus is the difference between the total amount that producers receive for a good or service (the price) and the amount they are willing to sell at.

(health costs, aesthetic costs, and costs of damage) are borne by society at large, and hence, these social costs are not reflected in the market price. Similarly, in the case of a positive externality, the demand curve does not adequately convey the total social benefit of consuming a good or service. Taking education services as an example, the demand curve captures the direct consumers benefit from the education, but fails to capture the additional benefits that education confers to society as a whole, because of the demeanor of the educated person or his or her problem-solving abilities, or his or her motivating someone to get an education that results in the person making a socially useful discovery.

The solution to addressing the problem of a negative externality, where the social cost (sum of private costs and externality cost) exceeds the production (or private) cost, is to internalize the social cost through fees or taxes or other measures. As a result, the costs to be borne by suppliers increase, all things remaining equal, this is accompanied by a concomitant rise in price and a fall in the quantity of the good traded in the market. It follows that, without any interventions, left to itself, the market would be trading in more goods than was warranted as compared to the socially optimum quantity. In such a situation, the market price would be lower than the socially optimum price. There would be a fall in optimal social welfare, which is why this is referred to as a market failure. The opposite would hold for positive externalities, but our focus on policy corrections would be toward negative externalities in the context of environmental pollution and sustainability.

### *Command and Control*

The first approach toward internalizing externality<sup>2</sup> costs is referred to as *command and control*, where either a pollution limit or an emission tax

<sup>2</sup> Costs are normally assumed to be borne by the producer of a good or service. Inputs are purchased, or implicit costs are calculated in terms of opportunities foregone. However, sometimes, a producer does not pay for a cost that emerges out of production, which hurts a bystander or third party. For instance, a producer of aluminum emits smoke, which causes a lung disease in a person residing in the neighborhood of the factory. The cost of medical treatment is an external cost. Ideally, it should be internalized as a cost incurred by the aluminum producer.

This is more efficient from a social point of view.

is imposed on a producer by the policymaker, typically a regulator. This optimal limit or fee is arrived at by equating the firm's marginal cost of reducing the pollution with the additional benefit that society would get as a result of the reduced pollution.

The pollution will need to be monitored, which may impose additional costs. There is a possibility for rent seeking also that arises because of the potential information asymmetry that can emerge between individual firms, monitoring agency, and the regulator (Kolstad 2000). Thus, there would result a certain amount of non-zero pollution that is optimal for each industry to produce, which is one critique of this approach by ecologists who are of the belief that optimal pollution levels should be zero. Further, this approach needs a lot of information to implement appropriately. The regulator needs to know the abatement cost functions of each firm at the micro level and arrive at an abatement cost curve for the industry. It is not in the self-interest of the firm to divulge the true information of its abatement costs to the regulator, given that the information would be the basis for imposition of a fee that would raise production costs. The regulator would also need to estimate the economic cost of all the damage caused by the pollution arising specifically from the industry. There are concerns with isolating the damage caused specifically by a pollutant emanating from a particular industry, identifying all kinds of damage that could be produced, and then, imputing an economic cost to the harm inflicted. Without this information, it would be difficult to arrive at an estimate of the marginal benefit that society would get as a result of the reduced pollution. Information intensity, therefore, is one serious drawback of the command and control scheme.

Another concern is that the marginal analysis results in local optima, that is, the choice of emission limit is appropriate at the micro level for the industry. However, in the context of sustainability, what matters is not the specific pollution emissions (flows) for an industry, but the impact of the sum total of the flows of all industries from all nations on the stock of the pollutant, and its interaction with other pollutants and their consequent impact on human and animal health and the ecology. There is no correlation with the global optimal pollution level and the local optimum pollution level arrived at using this marginal analysis, although the command and control solution is certainly an improvement as compared to leaving the market to function without any interventions.

### *Liability Rules*

A second approach, where the challenge of information intensity is done away with, is the imposition of liability rules. Here, the firm is allowed to operate without any emission standards imposed on it, but with the caveat that, should the activities of the firm cause any harm to others, it is the responsibility of the firm to compensate the affected parties for the losses borne by them. Thus, in anticipation of potential claims of damage, the firm would have to set aside a certain amount of resources (create a liability fund), which would result in additional cost for the firm, once again internalizing the externality. As the firm would be best aware of the extent of damage its activities would be causing, it would be best placed to estimate the extent of the liability fund that it sets aside. Even this approach has its problems. First, there needs to be an efficiently functioning institutional and judicial infrastructure that would dispose of law suits fairly and quickly. Further, the *affected parties* must be empowered enough to claim their damages from the firm. These preconditions may not be met in several developing countries. Thirdly, it is almost impossible to isolate the cause of damage as a specific pollutant from a specific industry and firm. Under that circumstance, implementation of liability rules can lead to long-drawn lawsuits with no easy solutions emerging. Fourthly, the affected parties may be many, dispersed, and non-homogeneous, and the costs of getting the parties together so as to make a claim itself may be prohibitively high. This is even more so if the affected parties are non-human sentient beings who have to be represented by special interest groups.

### *Property Rights*

In both the approaches discussed so far, the role of the policymaker is paramount, whether as a regulator, or to keep the institutional mechanisms credible and objective. A third approach, suggested by Coase (1960), proposes that there would be no need of a policy intervention, and affected parties could come to a negotiated agreement with the producers of a negative externality if property rights were adequately defined, whether in favor of the affected party or in favor of the polluter, and the costs of bargaining were zero (frictionless bargaining). Property rights, assumed to be prerequisites for any economic good within a market system, are

socially enforced constructs that determine how a resource or economic good is owned. They can be quite ambiguous for goods such as clean air or the high seas. This concept is best explained by a simple example.<sup>3</sup>

Consider a situation where there is a laundry located at the bank of a river downstream of a steel mill. The extent of effluent pollution from the steel mill is directly proportional to the production. Left to itself, the steel mill has no reason to install any sort of water filter to clean the effluent, it being most profitable to just dump it into the river. As a result, the output of the laundry, and hence profits, get adversely affected. The laundry can set up some sort of a water treatment plant, but this could impose a cost on the laundry. If we now assign property rights to either party (the right to pollute the water of the river or the right to clean water), we create a situation where the polluter and the affected party can negotiate with each other.

Let us first consider the case where the steel plant has the right to the water of the river (therefore the right to pollute it). In this situation, the laundry owner would weigh the costs (loss of profits) incurred by it as a result of unabated production by the steel mill with the additional profit it would make if the steel mill installed a filter. The owner would be willing to compensate the steel mill to the extent of the additional profits if it were to install a filter. There is, thus, scope for negotiation, and a possibility of a socially optimal solution (acceptable to both the steel mill and laundry owner, considered to be society) to emerge. Alternatively, if the property right for the river is assigned to the laundry owner, he or she would have the right to clean water. Hence, the steel mill would weigh the costs of installing a filter versus the net benefits for the laundry owner from installing a water treatment plant on his or her own. Depending on the cheaper option, the steel mill can then bargain with the laundry to implement the most cost-effective option so as to maximize the profit of the laundry owner. Whether the property right is with the steel mill or the laundry, the net outcome in terms of the extent of pollution reduction will turn out to be exactly the same, although the entity that possesses the property right will benefit more.

<sup>3</sup> Draws heavily for Kolstad (2000).

The Coasean approach has been used by many to justify a *laissez faire* approach toward governance. However, this is not appropriate as the fundamental assumption underlying the use of property rights as a mechanism for correcting externalities is frictionless bargaining, which is impractical.

### *Tradable Permits*

The last approach is to create markets for non-tradable goods (or bads), such as pollution, to correct the market failures due to externalities (See Box 7.1). Thus, if a power plant were emitting CO<sub>2</sub> equivalents as an

#### *Box 7.1 Creating a market for bads*

The United States amended its Clean Air Act (CAA) to introduce a trading scheme for oxides of sulfur (SO<sub>x</sub>) and oxides of nitrogen (NO<sub>x</sub>), gases that were responsible for acid rain, a form of trans-boundary pollution. The CAA set limits for SO<sub>x</sub> and NO<sub>x</sub> from specified electric utility plants from the 48 mainland contiguous states of the United States. Each utility plant was required to obtain emission permits from the Environmental Protection Agency (EPA). Each permit allowed the holder a specified amount of emission, for instance, 1 ton of SO<sub>x</sub>. The CAA also allowed these permits to be bought and sold in a market like any other commodity. This market would be an efficient allocator of emission permits according to the specific needs of each SO<sub>x</sub> emitting unit, which could vary due to its vintage, technology, efficiency, and choice of inputs. Each firm would choose the number of permits to purchase or sell based on the marginal cost of reducing its emission and the prevailing price of permits in this market.

This is considered a *hybrid* program, as the government determines the maximum number of permits that can be traded in the market, but prices of the permits emerge from the market mechanism, independent of government interventions. The CAA does not treat the allowance to pollute (emission permits) as a property right. However, there have been some legal difficulties in defining the ownership of the allowances. If an allowance is not a property right, then can it be freely traded in the open market?

externality while generating power, one way to internalize the externality would be to restrict the amount of emissions from each plant by providing them a set number of permits to pollute. Generally, different power plants would have different levels of operating efficiency, and hence emission intensity, owing to the differences in technology, operations, management, and vintage. The permits would be tradable in nature, thus giving firms the flexibility to either reduce their own pollution or buy permits from cleaner firms who have permits to spare because of their abatement efforts. If the tradable permit market were operating efficiently, the price of the permit would be equal to the marginal cost of abatement of pollution for the firms, which would ensure that the pollution targets are reached at the minimum possible costs. This is a hybrid system, where markets are created artificially by the government, but allowed to operate independently to arrive at a price. The maximum quantity traded by the market, however, is defined by the government. Besides the economic efficiency that results as an outcome of using the market system, tradable permits are a potent form of policy because it defines the total pollution flow, which is arrived at from understanding the contribution of the flow to the stock of the pollutant and its effects on sustainability.

## Non-Market Externalities and Policy Interventions

In many poor economies, there are a number of traditionally determined non-market transactions that also result in externalities creating divergence between private and social costs and benefits. Hence, externalities can be seen in a bigger sense as institutional failure. Poor societies are heavily dependent on ecological capital and the services flowing from them. Barring agricultural land, there are no adequately defined private property rights. It may be noted that property rights may not be at the individual or private level. A community or a state could have rights too. To illustrate this kind of externality, we will take the help of two simple examples; one which shows unidirectional externalities and the other is about reciprocal externalities.

Let us consider the case of unidirectional externalities. Consider a country that is rich in forest resources and the policymakers decide to export timber. The government grants a concession to a private firm

to cut trees and sell abroad. Suppose the concession is granted for trees located in the upland forests of a watershed. It is well known that forests stabilize soil and water flow, while deforestation causes erosion and increased water supply fluctuation downstream. Suppose there are a number of poor farmers who are located downstream and become adversely affected by the felling of trees. How could the problem be resolved?

One possibility is that if the law recognized the property rights of the small farmers to ecological services of the watershed, then the timber farm would be compelled to compensate the farmers. There are practical difficulties, however. For instance, it could be that the damage done is located far away (in a big watershed) and the victims are scattered with unequal damages. Many of them may be unaware of the source of the damage. It is also likely that the timber firm may have more political clout in terms of being close to state officials who are supposed to monitor the forest. If no compensation occurs, the operating cost of the timber farm would be lower than the social cost of the activity. This gap would be larger if one goes beyond the short-term income effect on the farmers and looks at the long-run ecological damage done to the watershed. The macro outcome would also be unfair. Exports of timber would contain an implicit subsidy paid by poor farmers helping keep the price of timber low and benefitting the users of imported timber, who could be rich people in a developed economy.

This solution depends on the principle that the polluter pays. The sociopolitical conditions, however, may not be conducive to result in an actual compensation being paid. To complete the possibility, the right to fell trees could be given to the firm without any rights given to the farmers. In such a situation, the poor farmers would have to get together and compensate the timber firm to prevent them from felling trees. This is the converse—pollutee pays principle. From the efficiency point of view, both are equivalent, though the results are astonishing from the equity point of view. It may also be noted that, in such situations, the market for negotiation may be very thin if the poor farmers are not fully aware and organized.

In a poor country, as property rights are often ambiguous for grasslands, mangroves, coastal wetlands, and coral reefs, the state quite often treats it as public property, retaining its right to monitor the asset. These kinds of assets are often very difficult to monitor, and the information

that the state may have could be inadequate for ensuring optimum use and conservation. The local residents, on the other hand, are much more aware of the nature of the ecosystem services, but there could be instances of the failure of collective action to ensure optimal use of common property resources (CPRs). In some of the ecosystems where outsiders may come as tourists to enjoy the aesthetic aspects of the ecosystems, there could be a way out in resolving the problem. The tourist could be charged and the proceeds could be distributed to local residents to maintain the natural ecosystem and ensure that garbage and congestion are limited.

Ecosystems are CPRs, and there is no guarantee that the state will take over its management. Take the example of common pastures or grazing lands in a village. To preserve the ecosystem's properties, overuse has to be prevented. If badly managed, free riders could easily degrade the resource. Hence, restricting the use in an equitable fashion may require some kind of charge or some social sanction for violating the collective agreement. In poor parts of the world, the importance of these CPRs is more than that in more affluent developed communities. These are often sources of food and incomes like community forests and coastal marine fisheries (Dasgupta 1993). Empirical estimates of these kinds of dependence measured in terms of income can be as high as 25 percent in rural India. In Zimbabwe, the poorest 20 percent earn 40 percent of their real income from ecosystems. Globally, it is estimated that 2.4 billion people depend on biomass for heating and cooking and 250 million poor people depend on coastal CPRs. In many of these CPRs, such as in a forest, private property rights are hard to enforce for a community because the benefits may not be homogeneously distributed. The benefits could actually be mobile, like fish, birds, and insects, and any inorganic material of value may be non-uniformly distributed.

Most CPRs in poor economies are managed by local communities (See Box 7.2). The outcomes, however, are varied, ranging from obvious success to complete failures. Where a cooperative solution works, it helps create a network of working knowledge relationships, social capital, and trust. Cooperation also begets further cooperation, and the penalties for non-compliance become less harsh in societies that repose a lot of faith in cooperative solutions. Failure, on the other hand, is marked by community power structures that enforce entitlements based on wealth and influence.

**Box 7.2 Trust and credibility as an alternative to prices**

Sometimes, in a traditional (and often poor) community, property rights are not well defined, and hence, transactions are often not based on markets, but rather on certain social norms of trust and credibility. There is a literature that tries to look at grounds where promises are credible. A number of cases have been discussed, and there seems to exist a variety of reasons where transactions are possible in the absence of markets. For instance, mutual affection can be a basis for a credible promise, that is, both the parties care about each other sufficiently. The household is the best example of such promises. Promises could also be credible when it becomes common knowledge that those keeping their promises are trustworthy, and being trustworthy in a community context can be rewarding. People also have a disposition to reciprocate in a similar fashion to people who are known to be trustworthy. A third reason could be where there is an incentive to renege on an oral contract, and mutual affection or pro-social disposition is not enough. In such situations, there would be a socially constructed mechanism for creating incentives not to renege.

The essence of the mechanism is that those failing to comply with agreements without any justifiable cause will suffer some penalty or punishment. Alternatively, if an explicit contract becomes necessary, then, of course, it has to be enforced by an established structure of power such as an administrative authority or court of law. In traditional communities, these authorities could be tribal chieftains or warlords. Social scientists recognize that norms are often built on the strong emotional urge to punish those who have broken agreements. Formal markets may not be necessary for this purpose.

For instance, landlords would be preferred over landless, women could be excluded, and privileges become more and more entrenched. Lack of homogeneity in the community because of political or legal strife will also reduce the chances of arriving at a cooperative solution.

The management of most CPRs tends to change with the process of economic development. As incomes increase, the dependence on the CPR reduces breaking up the community norms, and hence degrading

the ecosystem. Economic development can also lead to population stresses if the nature of the development is not enough to create new job opportunities outside the system, and cooperation could become fragile. In such situations, not all the stakeholders are affected uniformly. As cooperative solutions break down through the process of economic development, it becomes easier to enforce private property rights if people's dependence on these assets reduce and people themselves migrate out in search of better economic opportunities.

### Prevalent Public Policy Interventions

While all countries today have formal laws and processes to address serious environmental problems, success in implementing them has not been as expected. One distinct difference between developed and developing countries has been the use in the former of economic incentives and market-based instruments to arrive at a social objective. Even under such market-based systems, rigorous checks and balances have to be built into the program to ensure compliance, credibility, and transparency (See Box 7.3). It should be unambiguously possible to measure whether a unit's emission is exceeding the number of permits it holds, and this information should be publicly available.

The experience of developed countries reveals the use of a number of regulatory alternatives to control for negative externalities like performance-based regulation, process-based regulation, co-regulation, economic instruments, use of guidelines and voluntary approaches, and finally, disseminating information and running public awareness campaigns on the importance of compliance. Performance-based regulations allow firms and individuals to choose the process by which they will meet the target set by law. Hence, the focus is on outputs, rather than inputs leading to government intervention being restricted to the output side alone. These regulations are typically used in the domains of health, safety and consumer protection. Many OECD countries have been increasingly using performance-based regulations in recent years. In process-based regulations, businesses have to manage production risks, implying that the producer must identify all the sources of hazards of its production process and develop least cost solutions to address these risks. It is believed that

**Box 7.3 The ups and downs of carbon markets**

Carbon emissions trading specifically targets the reduction of carbon dioxide (calculated in tons of carbon dioxide equivalent or tCO<sub>2</sub>e) emissions using permits. The market was set in place by the Kyoto Protocol as a means to address the problems of climate change. The market uses multiple mechanisms of joint implementation (JI) and the clean development mechanism (CDM), which entails trading among developed countries and between developed and developing countries, respectively. In carbon markets, a country having more emissions of carbon is able to purchase the right to emit more, and the country having less emission trades the right to emit carbon to other countries.

From a peak of about 30 euros in 2005, the prices of carbon fell to 0.1 euro by 2007, owing to poor design and allocation of emission permits. This was followed by further volatility, related to business cycles, and uncertainty related to extending the provisions of the Kyoto Protocol. In August 2015, there were 39 national jurisdictions and 23 sub-national jurisdictions with carbon pricing instruments. There were 38 pricing instruments in use, which was a sharp increase (90 percent) from the 20 instruments prevailing in January 2012. However, such carbon markets cover only a small fraction of global greenhouse gas emissions. The total emissions covered are 7 gigatons (GTs) of CO<sub>2</sub> equivalents, which represents only 12 percent of the annual emissions of CO<sub>2</sub>. Prices of carbon in such markets display a wide variation, ranging from 1 dollar to 130 dollars per ton of CO<sub>2</sub> equivalent. However, 85 percent of the emissions covered are priced at less than 10 dollars per ton. The monetary value of the instruments implemented is 50 billion dollars, as on August 2015.

*Source:* World Bank Report: <http://worldbank.org/content/dam/Worldbank/document/Climate/State-and-Trend-Report-2015.pdf>

firms are in a better position to do this, rather than being dictated to by a central regulatory authority. It is particularly useful in situations where ex-post testing of the product may be difficult or prohibitively expensive. Process-based regulations are widely used in the Netherlands, Mexico, and the United States.

Under co-regulation, the regulatory role is shared between the government and industry. Typically, a large proportion of industry participants formulate a code of practice in consultation with government. The code is enforced through sanctions imposed by the industry or professional organizations, rather than by the government. The advantage of this approach is that it allows industry to take the initiative in assuming responsibility for setting standards as well as compliance. It also leverages the expertise of industry participants more than the administrators. However, if left entirely to industry, it could lead to opportunistic behavior,<sup>4</sup> where industry would set standards lower than what would be desirable for maximizing social welfare. Regulators (for example, the National Competition Laws in Australia and the Netherlands) incorporate checks against the possibility of such opportunism.

Economic instruments like taxes, subsidies, and tradable permits are considered the best means of improving the alignment of prices with the objective of social welfare. These instruments have been used in a number of industries across many countries, such as, tradable permits in sulfur dioxide in the United States, green taxes in Denmark on CO<sub>2</sub> emissions, SO<sub>2</sub> emissions, and waste water discharge. Subsidies have been used successfully in the Netherlands in the form of income tax deductions for commuting by public transport. In South Korea, firms that reduce pollution or recycle waste are provided long-term low interest loans.

Guidelines and voluntary approaches are not strictly enforceable, and hence are often referred to as quasi-regulations. In Denmark, they are used in the consumer protection industry. If significant non-compliance occurs, there could be court proceedings. Firms have an incentive to comply with these weakly enforceable guidelines because wide non-compliance should result in a far-stricter regulatory framework. Voluntary approaches are accepted by firms because this may help them pre-empt strict government regulations, and firms may also enhance their reputation by taking the initiative to do something socially useful.

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<sup>4</sup> Opportunistic behavior occurs when, in an economic transaction, a party realizes that it can gain without paying—free riding on other people’s efforts, or even plain cheating by deviating from the rules of the game. It creates distortions in economic results.

## Enablers for Public Policy Interventions

Even where public institutions are strong, enforcing environmental and regulatory compliance is difficult because of the possibilities of opportunistic behavior, informational problems, market imperfections, and costs of measurement. There are some requirements for ensuring success for implementation of regulatory policies. For instance, markets may be far more complex than the textbook compliance of a regulatory firm. Thus, arriving at the correct figure for a standard or a tax can be a challenge. This leads us to the necessity of having a strong regulatory authority, transparent systems, and unambiguous regulations. Even determining the extent of tradable permits to be issued to each firm could be difficult, as could getting the firms to participate in the tradable permit markets. Getting such a constructed market to function would require norms and institutions, with possibilities for firms to take retaliatory action if a rival over-pollutes beyond the permits it owns or defaults on paying for permits. Thus, it is necessary to have a deep understanding of both markets and their functioning and an institutional infrastructure, which imparts credibility to constructed markets.

The economic agents involved in such types of markets and their associated transactions must have good skills in understanding and navigating the complexities involved. Sometimes, big industries take a long time to get down to the nitty gritty of trading of permits on a frequent basis. The sale and purchase of paper instruments in such types of markets represent an intangible property right for future collusion. Such transactions carry not only the usual commercial risk where a seller might default or a buyer go bankrupt, but also the possibility of false accounting. This necessitates the existence of a third-party referee with judicial powers to enforce the norms of the market. For these types of markets to work, it is imperative that the buyers and sellers keep their commitments. Moreover, the credibility of these markets depends to a large extent on the trust by the community at large because, in the final analysis, they are the ultimate beneficiaries. In developing countries, training and deploying of an adequate number of specialists for enforcing and monitoring environmental and social compliance is an additional enabler for public policy interventions to be successful.

