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Precaution in Coastal Regulation: From Principle to Practice

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Research and production support:

'Yes', 'Yes, but' or 'No'

Addressing a gathering of scientists at the 11th ISRO-JNCASR[1] Satish Dhawan Memorial Lecture in September 2010, Jairam Ramesh, the Minister of State, heading the Indian Ministry of Forests and Environment (MoEF) outlined how the process of environmental clearances for proposed projects should culminate in a choice among three decisions - 'Yes', 'Yes, but' and 'No' (Ramesh 2010). In the lecture the minister portrayed the difficulty of reconciling between what he termed 'two cultures' – one promoting economic growth and the other environment protection, often at loggerheads with each other. While admitting that 'Yes, but' decisions make up the majority of the environmental clearances today, he promoted this choice as a successful means to effecting 'inevitable trade-offs' between the two cultural factions.

Whether on account of a scientific audience he was addressing, or the occasion being the memorial lecture of India's renowned space scientist, the minister repeatedly emphasised the importance of using scientific knowledge in arriving at the above decisions. Particularly in the case of projects that receive 'yes, but' clearances (those cleared with specific conditions) the minister reiterated the need to improvise on the conditions making them more 'scientific, measurable, consistent and objective'. For 'yes' and 'no' decisions, he stated the need to arrive at these choices in the most 'transparent and consultative manner'. He also suggested that in many cases, the final decision on a project is merely a matter of checking the rule books – India's numerous environment related laws, which tell you if something is permissible or not.

While deciding on a project, do regulators know everything about its impacts on the environment or on human health? What actions or decisions can be taken in the event of simply not knowing enough about the impacts of proposed actions? What do regulators do in the face of uncertainties where all that science can tell us is that potential harm is likely? Are all environmental clearance decisions based on scientific knowledge? What if the requisite scientific knowledge simply did not exist? What are the forms of knowledge that are taken into account while making decisions in such an event?

Notwithstanding its simplistic narrative, the lecture has been widely circulated and read purely because official statements on why and how environment related decisions are made are rarely available for public consumption. In addition to the MoEF, several government boards, authorities and departments have been set up since Independence to decide on projects that have some environmental implication. However, little was and continues to be known about the drivers of final clearance decisions (the Yes, No and Yes, buts). Even lesser still is understood about what proportion of these decisions are scientific, legal, economic or political. Similarly, research on clearance procedures show that most decisions are not taken in a consultative or transparent manner even in its narrowest form, through the mandated public hearings for instance.

The decision to act or not act, and further how to act in the face of unknowns or uncertainties is the subject matter of the precautionary principle (PP). It is against this historical backdrop of unknowns in environmental governance that the present study on the precautionary principle was conducted. The minister's framework for environmental governance provides a number of areas where precaution can and must be applied. In addition to these areas, the present report is the outcome of a descriptive study that shows the extent to which key elements of the precautionary principle are embedded in the specific case of two environmental laws related to coasts. Thought this study, we point out the gaps between one of the most popular legal principles and its practical application.

[1] Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)

Acting on a principle

The fall-out of evolving human societies is that a number of actions, technologies, policies, products and indeed ideas are generated which hold the potential to cause harm to either the environment or human health, although both the nature of such harm and the actual type of response that should be taken itself maybe unknown. An examination of the evolution of jurisprudence related to environmental laws point to the evolution of key principles such as the precautionary principle in aiding decision-making to regulate actions of societies. However, questions on decision-making in the face of uncertainty invite opinions that are not just philosophical and practical at once, but are often deeply polarised. Although the precautionary principle itself is widely promoted in international and national policy platforms, its application to environmental and public health decisions is fraught with controversy. Some believe that the principle is simply not practical, is paralyzing and unscientific (Sunstein 2005) whereas others believe that ignoring its value in decision-making will end in catastrophic results. Indeed it has also been pointed by critics of the precautionary principle that its application by governments often goes unaccompanied by economic, social and even environmental assessments of such precautionary actions and thereby taking so-called precautionary actions need not always be beneficial to society (Cross 1996; Morris 2000; Goklany 2007;). Goklany (2007) even states that the principle itself provides no guidance on how it needs to be applied and compares it to Yogi Berra's admonition "when you come to a fork in the road, take it."

Recognising the merit in these arguments, yet others such as Alessandra Arcuri make a case for a 'mild interpretation' of the principle using both substantive and procedural norms, and actively promoting its use to guide rule-making (Arcuri 2007).

It may not be unfair to suggest that the debates on the precautionary principle are fractured on the fault line of the determinants of scientific knowledge and its application. Therefore those who repose faith in scientific advancements and technological solutions to risk management view the precautionary principle as being conservative and unreasonable. Whereas, those who subscribe to a healthy dose of scepticism on technological solutions and the limits of knowledge call for the exercise of precaution. The important role of science in the application of this principle needs to be emphasised. However, despite Jairam Ramesh's endorsement of science-based decisions, there is a central paradox in this aphorism particularly in the application of science using a precautionary approach. Precaution by inference is meant to be exercised in the face of scientific uncertainty but in response to a (unknown) probability of harm. An examination of the operation of this principle inevitably calls attention to the general process of 'science-based' environmental decision-making (whether precautionary or not), examining what constitutes scientific evidence (of impacts), the limits of scientific knowledge (about whether we know enough or not to take a decision), and the adequacy of scientific conditions ('measurable, fair and consistent') issued while saying 'Yes', 'No' or 'Yes, but' as satisfying the condition of precaution.

Origins of the precautionary principle

In complex societies it is necessary for laws to be backed by legal principles since it is impossible for the text of law (considered absolute) to cover all possible situations. However the precautionary principle is more of a guideline (as are most principles) and has been interpreted in a variety of ways. There are several papers that analyse the different interpretations and application of this principle though international and national conventions, policies or treaties. The various view points on the principle are on account of the multiplicity of definitions and interpretations of the precautionary principle. The idea of caution has probably been exercised by humans since time immemorial and is found in various proverbs or maxims such as 'looking before leaping'. However, most accounts that seek a legal origin of the precautionary principle in environmental law trace it to the '*Vorsorgeprinzip*' or the German environmental law principle that advocates 'forecaring and foreseeing', developed in the early 1970s (COMEST 2005). The most popular reference to a detailed articulation of the principle has been the Rio Declaration on Environment and Development. Principle 15 of this declaration reads, 'In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.'

The Rio Declaration highlights the following aspects of the principle:

a) the appreciation of harm (serious or irreversible damage)
b) the lack of full scientific certainty regarding the nature of the harm or the manner to respond
c) the necessity of acting in the face of uncertainty
d) the importance of cost-effective measures

Another popular interpretation of the precautionary principle was penned in January 1998, at Wisconsin, USA by a group of scientists in a document known as the Wingspread Statement on the precautionary principle. It states 'when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof. The process of applying the precautionary principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action.'

The Wingspread Declaration note on the PP, considered to be a strong version of the principle highlights the following aspects:
a) potential harm to human health in addition to the environment
b) the need to place the burden of proof (of the nature of harm) on the proponent
c) an open and democratic process of applying the principle including potentially affected parties
d) examination of alternatives including that of taking no action

Precautionary principle and precautionary approach

Various documents make references to either the term 'precautionary principle' or a 'precautionary approach' and much is made of the difference between both terms. Some refer to the term 'precautionary principle' when emphasising the philosophical basis of precaution and others believe that the term 'precautionary approach' refers to its practical application. In most discussions, the terms are used interchangeably where it is believed that the end result is action. The Rio Declaration, uses the word 'approach' in its English version, and the word 'principio' in its Spanish version (COMEST 2005). However, although the distinction between terms appears indistinct, legal experts emphasise that the term 'precautionary principle' is more authoritative than the 'precautionary approach' since the former implies that it is derived from a legal principle or a source of law. This accords it greater weightage in international documents and legal text than the latter. However, this is not to state that 'precautionary approaches' cannot be made legally binding.

A conceptual framework to identify elements of PP in law

Along with forest and grassland ecosystems, coastal areas in India are biodiversity rich social ecological ecosystems which have seen an increased presence of 'non-coastal' development projects. Recognising the increasing pollution of coastal stretches, the Late Prime Minister, Mrs. Indira Gandhi's directions to keep coastal stretches 'pollution free' led to the formation of the Coastal Regulation Zone Notification, 1991 (Chainani 2009). While this central subordinate legislation introduced under the overarching Environment (Protection) Act, 1986, was a law dedicated only to coastal areas, there are a range of other laws that also pertain to these coastal stretches and which offer some safeguards against harm to the environment and health. Of these, the Water (Prevention and Control of Pollution) Act, 1974, was one of the earliest legislations that vested state governments with powers to protect all forms of water sources, even in coastal areas.

Along with climate change related uncertainties, there are varying levels of unknowns related to the impacts of water pollution and the precise impacts of coastal development on ecosystems and human populations that draw attention to the PP as a means of acting in the face of unknowns. As part of this study, I undertook to examine these two laws (the CRZ Notification, 1991 and the Water Act, 1974) to assess the extent to which these laws and decision-making under their ambit facilitated or incorporated the precautionary principle.

Much has been written about whether the precautionary principle provides any guidance or direction for decision-making itself. However, it is also regarded that the broad idea of precaution is at the very heart of many of our environmental regulations. In several cases, the PP has been quoted in court cases that deal with environmental problems. In Vellore Citizens' Welfare Forum vs. Union of India and Others [1996 (5) SCC 647], a three Judge bench of this Court referred to the 'precautionary principle' and the new concept of 'burden of proof' in environmental matters. The Supreme Court observed that the Precautionary Principle and the Polluter Pays Principle have been accepted as part of the law of the land. The Court in the said judgment, on the basis of the provisions of Articles 47, 48-A 'and 51-A(g) of the Constitution, observed 'we have no hesitation in holding that the Precautionary Principle and the Polluter Pays Principle are part of the environmental laws of the country.' Some of the other cases where the PP makes a prominent appearance and elements of the principle appear in the judgement of the court are seen in the case of A.P. Pollution Control Board vs. Prof.M.V.Nayadu (Retd.) & Others (1999) (reminding the regulator – the appellate authority of its responsibility to assess risks and make precautionary decisions in the case of specific polluting industry), the Karnataka Industrial Areas Development Board versus v. Sri C. Kenchappa & Ors. [Case No Appeal (civil) 7405 of 2000, judgment in 2006] (asking that permission has to be sought by the promoter from the regulator to undertake an activity) and M.C. Mehta v. Union of India (October 11, 1996) (ordering the government to limit construction in order to protect Badkhal Lake and Surajkund) and S. Jagannath v. Union of India (December 11, 1996) (requiring environmental assessment before permitting the setting up of commercial aquaculture).

However, there is an immediate concern identified earlier in the international context of the PP, which poses its problems in the Indian context of law as well. A perusal of various Indian environment related laws shows that the actual words 'precautionary principle' or 'precautionary approach' are not used in any of the laws dealing with the environment. Perhaps this is why there is also no working legal definition of the same in any of these laws. The main environmental policies of the country such as the 1991 Policy on the Abatement of Pollution, and the National Conservation and Strategy Policy Statement on Environment and Development, 1991 and even the National Environment Policy (NEP) of 2005 provide no explicit idea of how approaches to environmental decisions can be based on this principle. The NEP of 2005, merely states that the policy itself is based on several principles, one of which is that of the precautionary approach. To judge the extent to which the provisions of these laws or their implementation are precautionary or not involves evolving certain criteria of what constitutes precautionary action.

Elements of precaution from key literature

From the range of definitions and critiques of the PP, one can identify a few criteria to test the xtent to which enviornmental decisions are precautionary in nature or what elements of precaution they contain. I draw mainly from the approaches advocated by legal scholar Alessandra Arcuri (2006), the Science and Environmental Health Network (www.sehn.org) - a US based group advocating PP as the basis for environmental and health policies and the work of the Precautionary Principle Project (www.pprinciple.net), particularly from their Asia and Pacific workshop recommendations on operationalising the principle.

As critics point out, one can either have a scenario of absolutely no precaution in the event that there is any uncertainty regarding the impacts of an activity or there can be a scenario that Arcuri (2006) elaborates on called Radical PP, wherein any activity that has the slightest hint of posing a risk or hazard needs to be banned irrespective of its magnitude, social benefits or the costs of regulation. Both these extreme versions of the principle would invite considerable conflict and perhaps undesirable impacts. Therefore an in-between version of the principle is suggested by her. In recognition of the diverse view points, and the implications of an extreme interpretation and application of the principle, while yet bearing in mind the various contributions that disciplines like economics and law have made to the precautionary principle, Arcuri proposes a mixed version of the principle, the adoption of which will characterise environmental decision-making in the following manner:
1. The decision-making process under conditions of uncertainty will be both iterative and informative. By this, it is implied that the procedures involved in environmental clearances for example will contain ample scope to allow new information to flow in at various stages of a project.
2. Regarding the requirement of demonstrating evidence of harm or the distribution of the burden of proof, Arcuri suggests that the regulator should use scientific evidence available to demonstrate the existence of triggering factors, thereby placing a 'minimal' burden of proof to show harm. She also suggests that the initiator of a project provide some information regarding the potential impacts of his/her activity, using the best available scientific information.
3. Environmental decisions should (a) be informed by science, (b) be open to public participation and scrutiny and (c) should err on the side of preservation.

The Science Environment and Health Network (SEHN) (founded in 1994 by a group of environmental organisations in North America) is a strong advocate of the Wingspread Declaration's interpretation of the PP and their literature on the subject characterises and advocates different elements of precautionary action. SEHN provides a range of interpretations on how one can apply the PP. For instance they state that '*any action that contributes to preventing harm to humans and the environment, learning more about the consequences of actions, and acting appropriately is precautionary*.' They state that an action need not be precautionary in nature only if it prohibits something. They provide a range of criteria to judge whether environmental decisions or actions are precautionary. They also state that precaution does not work if it is only a last resort and results only in bans or moratoria. They link precautionary actions to the following implementation methods:

1. Exploring alternatives to possibly harmful actions, especially "clean" technologies that eliminate waste and toxic substances;

2. Placing the burden of proof on proponents of an activity rather than on victims or potential victims of the activity;

3. Setting and working toward goals that protect health and the environment; and

4. Bringing democracy and transparency to decisions affecting health and the environment.

Between June 20-23, 2004, a workshop was held by the Global Biodiverstiy Forum for Asia on the precautionary principle in natural resource management and biodiversity conservation to deliberte on how the PP could be applied. This was the fourth regional session for Asia and was held in Manila, the Philippines. The report from this workshop states *'It is helpful to adopt an adaptive*

management approach, which includes monitoring and periodic review to provide feedback, and amendment of decisions in the light of new information. The involvement and consultation of stakeholders is an important element of this process. The precautionary principle should be implemented and understood in a manner consistent with this approach.'

The concepts suggested in the above critiques and approaches to the PP's operation are used in this report to formulate a framework to examine the extent to which this principle drives our laws. Therefore the elements of precaution that can be identified for exploration of the operational aspects of the precautionary principle in a law can comprise the following questions:

Q. What circumstances trigger the application of the principle within the law?
Q. Timing: when can and should a regulation be adopted?
Q. How are regulations presently formulated? (Do they follow the preservation error or the technology error)
Q. What are the monitoring procedures and institutional arrangements for the same as provided by the laws?
Q. Are there periodic reviews in planning documents or management plans or in the environmental standards or thresholds outlined in these laws?
Q. What is the extent and nature of consultations with stakeholders? What aspects are discussed with the public?
Q. How is the burden of proof distributed between regulator and proponent of an activity?
Q. What are the documents or the evidence submitted by the proponent which constitutes evidence of the impacts of his or her proposed actions?
Q. Does the regulator show scientific evidence of triggering factors of harm? To what extent does science inform this?
Q. Is the decision-making process iterative?
Q. Is there scope within the law or its implementation for new information to flow in periodically?
Q. Are environmental decisions open to all for public scrutiny?
Q. Are environmental decisions based on science?

Attempts were made to assess the functioning of the Water Act, 1974 and the CRZ Notification, 1991 from these above mentioned questions.

Methodology

The study examines key areas of the clearance continuum (law-making, clearance and monitoring) through a single broad question:
Q. To what extent is the approach of precaution embedded in decision-making under the CRZ Notification 1991 and the Water Act, 1974? I attempted to examine this question on a continuum that examines a) the text of the law, b) the conditions under which projects are cleared or rejected and c) issues related to the monitoring of these conditions.

a) Elements of precaution in the legal text: Within the select pollution related laws (the Water Act, 1974 and the Coastal Regulation Zone Notification, 1991 under the Environment (Protection) Act, 1986), the study identified various expressions of specific concepts related to the precautionary principle which are its more well-established elements. These include studying aspects such as:
1. Specific precautionary actions
2. Articulation of the possibility of harm/ threats
3. Burden of proof / responsibility for precaution and safety
4. Assessments of alternatives
5. Addressing scientific uncertainty
6. Proportionality (process for assessing benefits from precaution or the converse)
7. Transparency and participation (as facilitating precaution)

In addition, I also contacted 4 pollution control boards - namely from Orissa, Tamil Nadu, Kerala and Karnataka and held meetings with some of the concerned officers and also filed Right to Information applications to obtain information about the functioning of these boards and the operation of various legal clauses that pertain to different precautionary elements.

b) Analysing clearance related decision-making: Nearly all projects have a combination of environmental, economic, social and political repercussions, often with conflicting objectives and values. Environmental decision-making over such projects by regulatory bodies therefore is never a purely scientific exercise, but an intensely political one, aided by calculations of social-political costs and benefits and value-laden judgements. Many of these decisions find resonance in scientific and legal principles and still others do not. Jairam Ramesh strongly advocated for a science-based decision making process, but it is important to assess the viability of this and also identify the extent to which decisions rely on science or adhere to legal principles such as the precautionary principle. I attempted to examine the decisions made by the Pollution Control Boards while issuing NOCs, but information was not forthcoming and I was only able to obtain information at the very last month of the project from only one Pollution Control Board (Orissa). Therefore, in order to examine decision making, I decided to examine the final letters of rejection or clearance issued by the Ministry of Environment and Forests (MoEF) for projects that are cleared under the CRZ Notification.

For this purpose, I obtained copies of clearance letters from Kalpavriksh an environment NGO which had filed a Right to Information application in the year 2009 to obtain copies of all CRZ clearance letters issued by the MoEF. Kalpavriskh was given letters from 1999 to 2004. These years are significant years in the implementation of the CRZ Notification as they were the years that saw a number of amendments to the law and these years also marked the most active citizen action on this legislation. The last amendment to the CRZ Notification was also made in the year 2004 after which the MoEF went into its controversial reform process (Sridhar et al 2008). Wherever possible quantitative analysis was conducted on the data to show overall trends and patterns within environmental decision-making processes that are related to precautionary principle elements [see point a)].

c) Monitoring compliance: At the outset of this project attempts were made to obtain clearance information on projects at an early stage, so that a broad level of ground verification of compliance to

clearance conditions could be attempted. The clearance letters issued by the MoEF under the CRZ Notification were not considered for monitoring compliance since these were older projects and obtaining the latest clearance conditions would necessitate at least one round of Right to Information applications. This would exceed the time and resource constraints of the present project. The monitoring related information contained in the conditional clearance letters issued by the MoEF was analysed to ascertain observable trends and patterns therein.

Limitations of the study

The Asia and Pacific Workshop Report of the Precautionary Principle Project declared that there are both explicit and implicit uses of the precautionary principle. It states that there are some instances where the PP's application is explicit and unambiguous whereas in other decisions the PP is implicit. They also raise an important point that to actually determine whether a decision was indeed precautionary or not (where it is not explicit) requires an examination of the context and motivations for decisions and management interventions. The report also states that it is not always easy to determine whether decisions or management interventions have been implicitly precautionary, especially as many decisions in biodiversity conservation/NRM, take place in the face of some uncertainty. These observations set the limitations of my study in which I rely on the text of the law and final project related decisions as my data sets.

An important admission to highlight at the outset of this study is that my examination of the operation of elements of the precautionary principle in these laws ranges from a conscious application to an inadvertent application. I do so recognising that all decision-making over environmental projects in the country takes place under constraints such as limited scientific data or understanding, limited time and resources and under certain procedural requirements. Therefore assessing to what extent these laws and their decision, and decisions taken under these provisions are grounded in science and to what extent they already incorporate and operationalise elements of precaution gives us an idea of their performance under a full fledged and fully conscious precautionary regime.

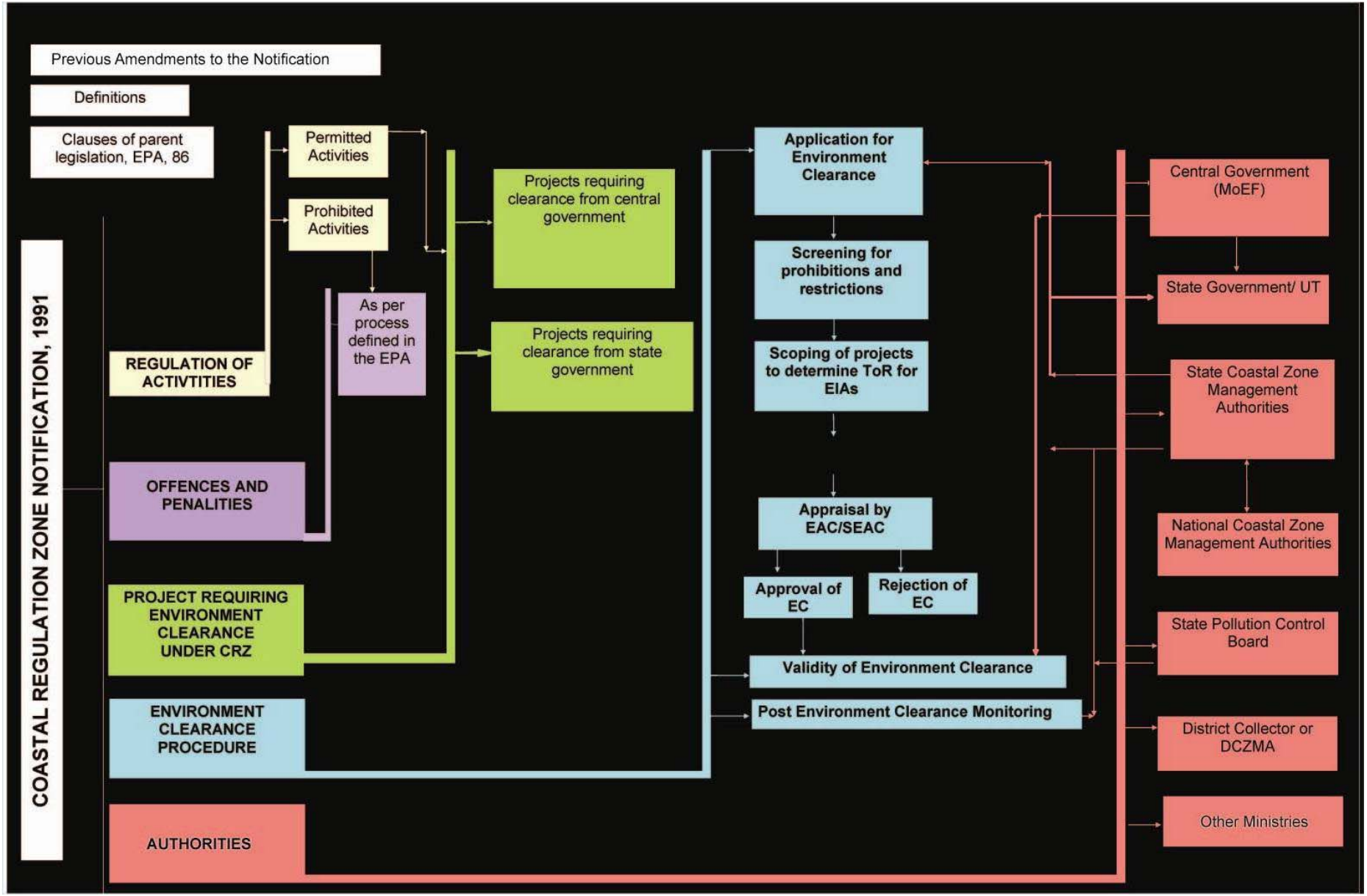
Introduction to the Coastal Regulation Zone Notification, 1991

The CRZ Notification was issued in the year 1991 using the provisions of the Environment (Protection) Act, 1986 and the Environment (Protection) Rules, 1986. The EP Act empowers the Central Government to delineate areas where anthropogenic activities can be regulated and restricted. The CRZ Notification is therefore a specialised legislation, which was introduced with the intention of protecting the coastal environment of India at the behest of Mrs. Indira Gandhi who expressed concern over the degradation of beaches and coastal areas.

The coastal stretches of India's mainland and her numerous islands including the Andaman & Nicobar Islands and Lakshadweep, were governed by the Coastal Regulation Zone Notification, 1991. For the purpose of effectively legislating on coastal protection, the law set limits to the area under its purview. The Coastal Regulation Zone or the zone under the purview of the CRZ Notification was declared comprising the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action (in the landward side) up to 500 metres from the High Tide Line (HTL) and the land between the Low Tide Line (LTL) and the HTL. The 500-metre CRZ boundary is drawn at a radial distance (as the crow flies) uniformly from the HTL, and runs parallel to the coast. The measurement of the 500-metre boundary of the CRZ does not take into account the height of elevations of land on the coast, such as the height of hillocks, promontories or cliffs. The MoEF has recognised this while conditionally approving the Coastal Zone Management Plans (CZMPs) prepared by the coastal states, wherein high cliffs and hillocks are included in the CRZ and the CRZ continues several metres beyond these structures (which measure more than 500 metres in height).

In the case of rivers, creeks and backwaters, the notification states that the CRZ would apply to both banks of the water body, but the distance of the CRZ from the HTL may be reduced from 500 metres on a case-by-case basis, with the reasons for the reduction to be recorded in the CZMP of that State. However, this distance was not to be less than 100 metres or the width of the river, whichever was less. Therefore, lands in these areas are also subject to the regulations of the notification. This notification has recently been replaced by the CRZ Notification 2011.

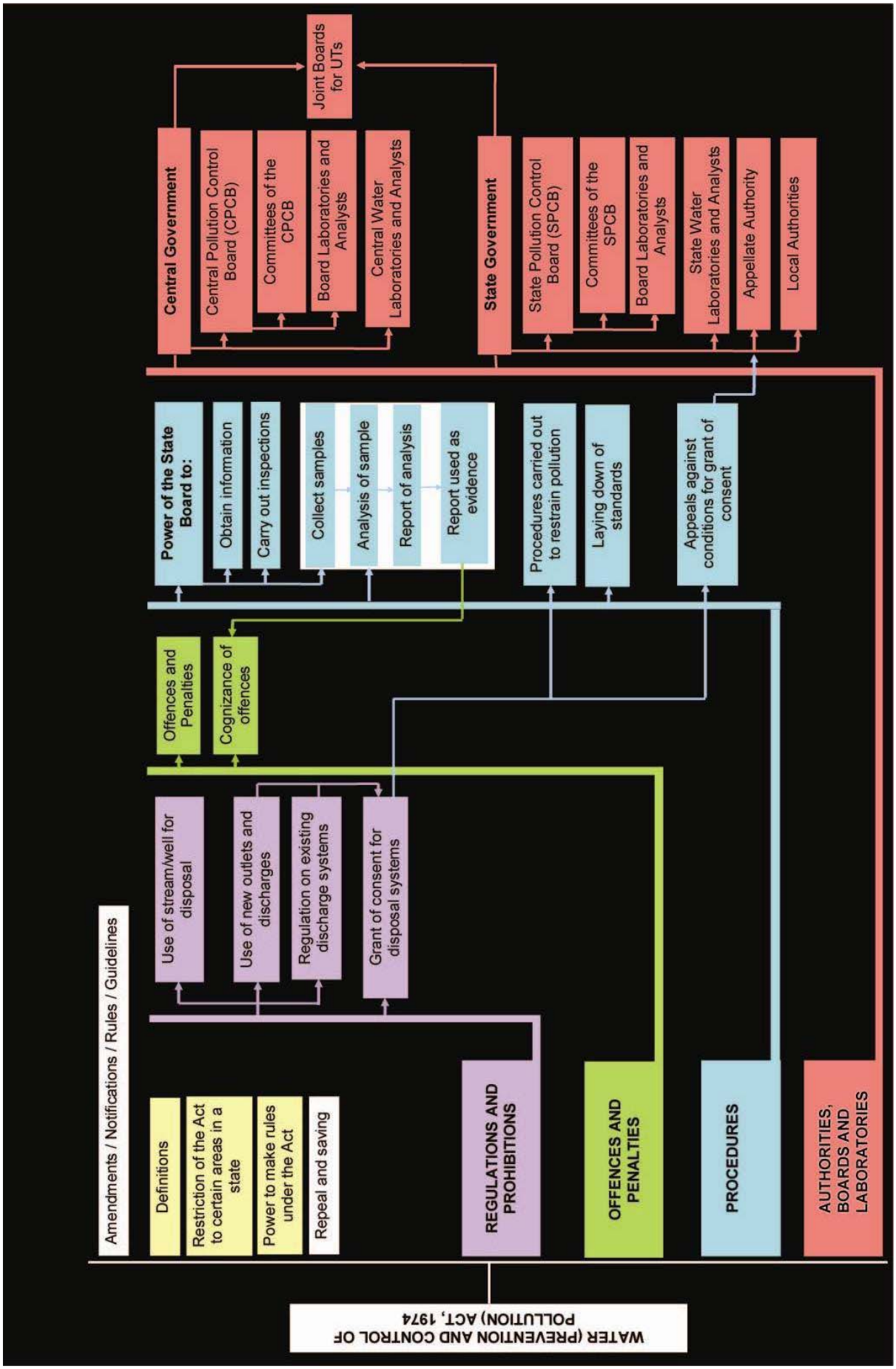
Diagramatic representation of the CRZ Notification (Source: Menon et al. 2008)



Introduction to the Water (Prevention and Control of Pollution) Act of 1974

This was one of the first important environmental legislations in India. Before the enactment of the law, there were few initiatives to legislate pollution control at the national level. A committee that reviewed existing laws found that a comprehensive legislation to address the issue of water pollution in the country was inadequate. On the prompting of various states, a bill was introduced in the Rajya Sabha in 1962 and was examined by the Select and Joint Committees of Parliament. The bill sought to provide for the establishment of agencies at the central and state levels to provide for the prevention, abatement and control of pollution of rivers and streams, for maintaining and restoring the wholesomeness of such water and for controlling existing and new discharges of domestic and industrial wastes. Water is a subject in the State List of the Constitution. The Act was enacted as a central law in pursuance of Article 252(1) of the Constitution which empowers the Union Government to legislate in a field reserved for the states, where two or more State Legislatures pass a resolution consenting to a central law. All States have adopted the implementation of the Act as enacted in 1974. The Act provided for the establishment of administrative boards under the executive branch of the central and state governments. The powers and functions assigned to the boards broadly include the setting of standards (for effluent and sewage disposal) and advising the government on measures to combat pollution. The State Boards have the authority to grant consent to the use of new or existing disposal systems, and may impose certain conditions on the grant of such consent. The law provides for penalties for the contravention of the provisions of the Act, which includes the failure to comply with the directives of the State Board. It also provides for the establishment of Central and State water testing laboratories whose primary functions are to aid in the setting of standards, and for testing of water samples collected and analysed under the provisions of the Act, to ensure compliance with the standards enforced or to establish contravention of the same.

The law defines pollution as "such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly), as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms". The application of the Act therefore covers streams, inland waters, subterranean waters, and sea or tidal waters.



Diagramatic representation of the Water Act 1974 (Source: Menon et al. 2008)

An assessment of elements of precaution in the CRZ Notification, 1991

Specific precautionary actions

- The act of delineating a 500 meter stretch as a regulated zone by itself merits description as a precautionary action, since this was a decision taken without great scientific certainty or a stated scientific rationale (Chainani 2006; Menon & Sridhar 2007)

- The law prohibited a set of industries within the CRZ area which were non-coastal or which did not require the foreshore or waterfront for operation. Of course this approach changed over time as each amendment brought in newer activities which were non-coastal (such as the IT and service sector industries or SEZs)

- Declaration of certain areas as CRZ - I areas, thereby declaring that such areas are no-development areas

- Declaration of a No-Development Zone within the CRZ - III areas (considered to be rural or non-developed areas).

- Instituting a set of authorities for the purpose of implementation of the law, such as the Coastal Zone Management Authorities can be interpreted as a precautionary action from the procedural point of view. Of course, their functioning and operation reflect how far they facilitate precautionary actions. In the case of the CZMAs, under the CRZ Notification, these authorities have been for the most part, non-functional and not proactive on account of a variety of reasons (Menon & Sridhar 2007).

Articulation of the possibility of harm/ threats

- The notification does not contain a preamble or an introduction outlining why it was introduced or any rationale for labelling the coast as 'sensitive'. However this can only be inferred from the history of its introduction - mainly traceable to Mrs. Gandhi's letter in 1981 calling caution to the harm to coastal stretches from unregulated development and pollution.

- By placing certain ecosystems on the CRZ -I list, the notification calls attention to their vulnerability to harm from human activity.

Burden of proof / responsibility for precaution and safety

- Under the CRZ Notification, 1991 a number of activities needed to obtain environmental clearances or apply for permissions to various authorities, providing information that will prove whether the activity is potentially safe or can cause harm.

- Project authorities are required to submit EIA reports under the EIA Notification and are required to submit applications for clearance under the CRZ Notification. However the 1991 notification did not specify a format or the nature of information to be shared by the proponent in the application.

- The regulator was required to make decisions through various expert committees and assess the impacts of a proposed activity based on the information provided by a proponent.

- In some cases, such as for the construction of jetties and wharves in the Lakshadweep, scientific studies are mandated. The results do not decide whether such an activity will be permitted or prohibitted. They are conducted to only ensure that such activities have minimal damage to corals and other biodiversity. This implies that scientific information is used to minimise possible harm but not limits are placed on the nature of these precautionary actions.

- The proponent has the responsibility of proving harm or benefit from his or her actions in the monitoring phase. There is no responsibility on the regulator at the monitoring phase, to review the earlier conditions of either precaution or otherwise. The regulator's responsibilities seem to be limited to merely checking if conditions are met and not to assess their benefits.

Assessments of alternatives

- No process was outlined for this. However it is only assumed that the project proponent was required to show why a particular site was selected for the project. This by itself does not constitute an options assessment.

- The assessment of a proposal was to take place within 90 days of receipt of the application and requisite documents and data on the project. The regulatory authorities were to decide on the project after this.

- Separate procedures were assigned for some activities such as classified operational components of defense projects [are 3(2)(i)]. However, while this offered the potential to assess alternatives for such activities, being located on coastal stretches, no information is publicly available on how these decisions were taken. Thus, procedural options to exercise this element of the PP - assessing alternatives - does exist in the text, but appears to be arbitrary in actual practice.

- Through amendments, the notification did permit construction for tourism development in the Andaman and Nicobar Islands and in the Lakshadweep Islands but this was to be based on an integrated coastal zone management study. Rather than offer assessments options explicity, it appears that the notification provided some opprtunity to explore alternatives. However, since this was not a publicly shared document and was not planned with public participation, it is not known whether alternatives were indeed identified or what criteria or science they were based on.

Addressing scientific uncertainty

- The operation of the CRZ Notification hinges on the identification of various areas as CRZ -I, II, III or IV. The text of the law provides some indication as to how these areas can be declared, but there is a vast amount of scientific uncertainty regarding some of these criteria such as 'areas of inundation on account of sea level rise'. There is much speculation regarding what are significant thresholds for declaring certain areas as ecologically sensitive and thereby setting them apart from other areas with similar characteristics. For example, the notification declares fish breeding areas or turtle nesting beaches as CRZ -I (ecologically sensitve zones). However, vast stretches of the coast meet this description since sea turtles (such as olive ridleys) nest in virtully all beaches. The notification did not provide the means to prioritise in such situations. The CZMPs appear to have utilised some scientific information to identify areas that meet such criteria, but for the most part, the categorisation of the coast as done in the CZMPs is still a matter of debate and disagreement.

- The information available to either reject or clear a project is usually generated and submitted by a proponent. Final decisions on each project proposal are taken by expert committees at the central government level. The state level CZMAs also decide whether a project can be permitted or not, but largely on criteria that are procedural or legal. Regarding scientific uncertainty, it appears that expert committees make the final decision on whether adequate scientific information has been provided for them to decide on a Yes, No or a Yes but kind of decision.

- When the various amendments to the CRZ Notification were made, this was not accompanied with an explanation about the scientific implications of permitting these activities on the coast. Therefore it seems that scientific information about impacts were not considered while reversing the precautionary action of prohibiting activities on the coast.

Proportionality (process for assessing benefits from precaution or the converse)

- On the whole it can be said that the various amendments to the CRZ Notification were indeed an exercise of the political decision of exercising precaution. All those amendments that were accompanied with any sort of explanation stated that they were introduced since hardships were experienced by local communities due to restrictions on activities.

- The notification by itself does not mention a process or procedure for incorporating proportionality - but since all such decisions can be interpreted as exercising some amount of cost-benefit or cost-effectiveness arguments while making restrictions, so too, in a general sense, does the CRZ Notification. However, since this process is not open to scrutiny, it cannot be labelled as a conscious precautionary element.

- The clearance granted under the CRZ is valid for a period of 5 years after which an application for renewal of clearance is made. The notification itself does not provide details about the nature of information required to be made available at the time of renewal. Therefore although this clause in the notification has the potential for addressing the nature of harm or re-evaluating the precautionary action, the opportunity was not utilised.

- The monitoring process as outlined by the law merely states whose responsibility monitoring shall be. However, no information is contained in the text of the law regarding the nature of such monitoring, whether any assessments should take place post-clearance, and post-project operation, about the benefits of such clearance, negative impacts or the need for certain precautionary action.

Transparency and participation (as facilitating precaution)

- No option of public hearings for any of the projects was mandated by the ntification.

- The notification itself did not explicitly state that the Coastal Zone Management Plans (CZMPs) were to be shared with the public. The planning process or the identification of various CRZ categories was not open to the public either.

- The public is not provided information on how a final decision has been taken regarding a project. This is of course available through the Right to Information Act, but only clearance letters are generally made available not minutes of decisions taken by expert committees and officials involved in making the final decisions.

There also appears to be no substantial effort towards transparency or community participation as outlined in the text of the law as far as monitoring of clearance conditions is concerned. Therefore, the exercise of any of the precautionary elements through monitoring and periodic review excludes the larger public denying such precautionary action (if any) a shared value.

Implementation of precautionary elements in the CRZ Notification

The table below show the number of projects that were cleared between the years 1999 and 2005. These were significant years in the implementation of the CRZ Notification since these were the years that saw the most amendments to the law. After 2005 began the process of the revision of the CRZ Notification as mentioned earlier..

Table 1 showing number of projects that were either cleared, rejected or pending clearance between the years 1999 and 2005 (including revised clearances for earlier projects)

	Agriculture	Communication	Erosion control	Fisheries	Hotel / Resorts / Tourism	Housing / settlements	Housing/ Building construction	Industrial Infrastructure	Mining	Oil and Gas	Pollution control	Port / Shipping	Power	Roads / Highways / Airstrips	Social Infrastructure	Grand Total
A&N Islands			1	2	1		1	1				11	1	1	1	20
Andhra Pradesh					4		1	2	1	1		8		1		18
Daman & Diu														1		1
Goa					22							6				28
Gujarat				3	1			9		3	3	19				38
Karnataka					3							5	1			9
Kerala				2	7							6		1		16
Lakshadweep Islands					2							2	1	1		6
Maharashtra	1		1	1	2	1	7	3				18	1	4		39
Maharashtra								1								1
Not given					1							1				2
Orissa				7								3				10
Pondicherry				3	2							1				6
Tamil Nadu		1	1		6			3	4		1	4		2		22
Thiruvananthapuram					1											1
Tuticorin								1								1
West Bengal				2												2
Grand Total	**1**	**1**	**3**	**20**	**52**	**1**	**9**	**20**	**5**	**4**	**4**	**84**	**4**	**11**	**1**	**220**

Graph 1 showing the categories of projects cleared, rejected or pending clearance under the CRZ Notification, 1991 between 1999-2005 (inlcuding revised clearances for earlier projects)

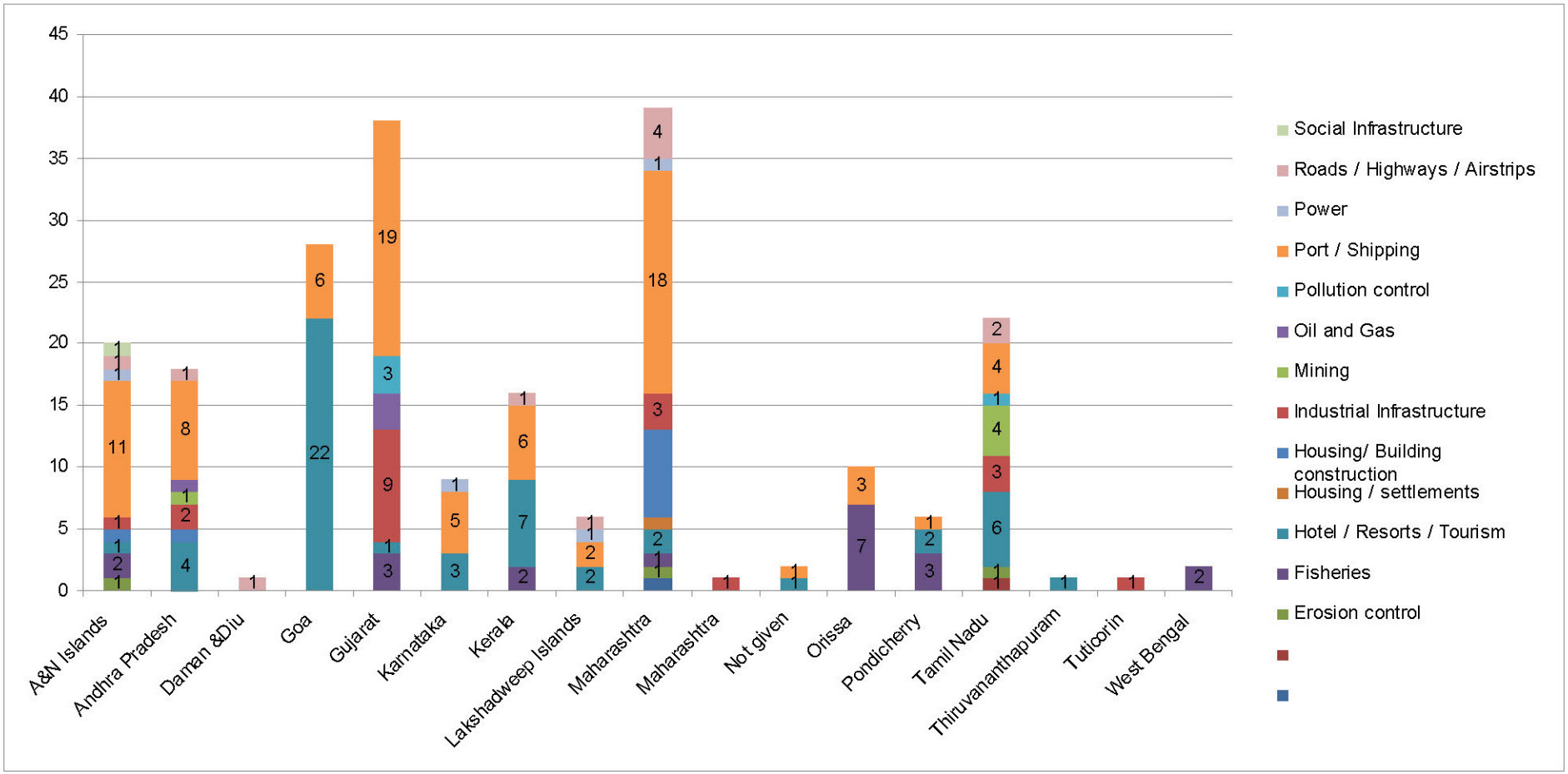
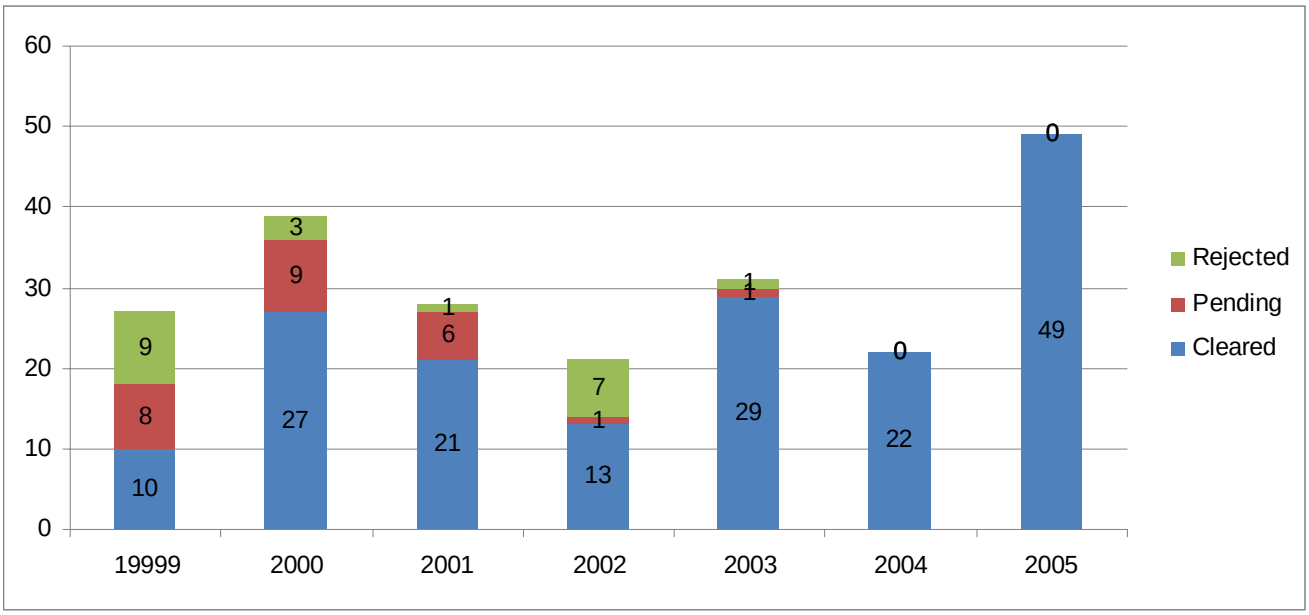
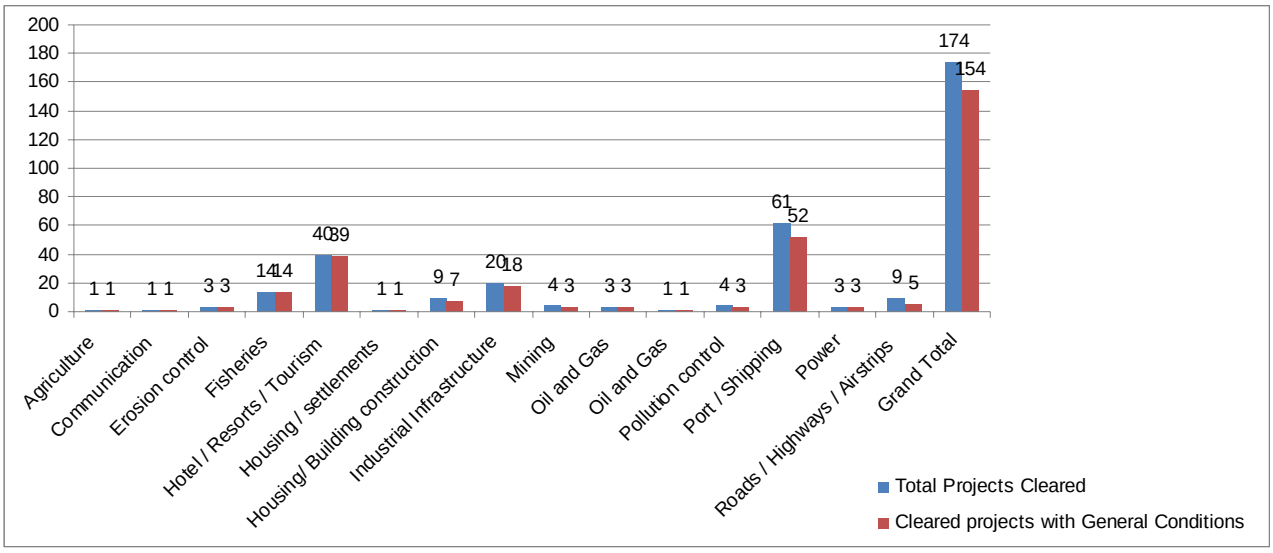


Table 2 and Graph 2 (below) showing the number of projects cleared, rejected or pending clearance under the CRZ Notification, 1991

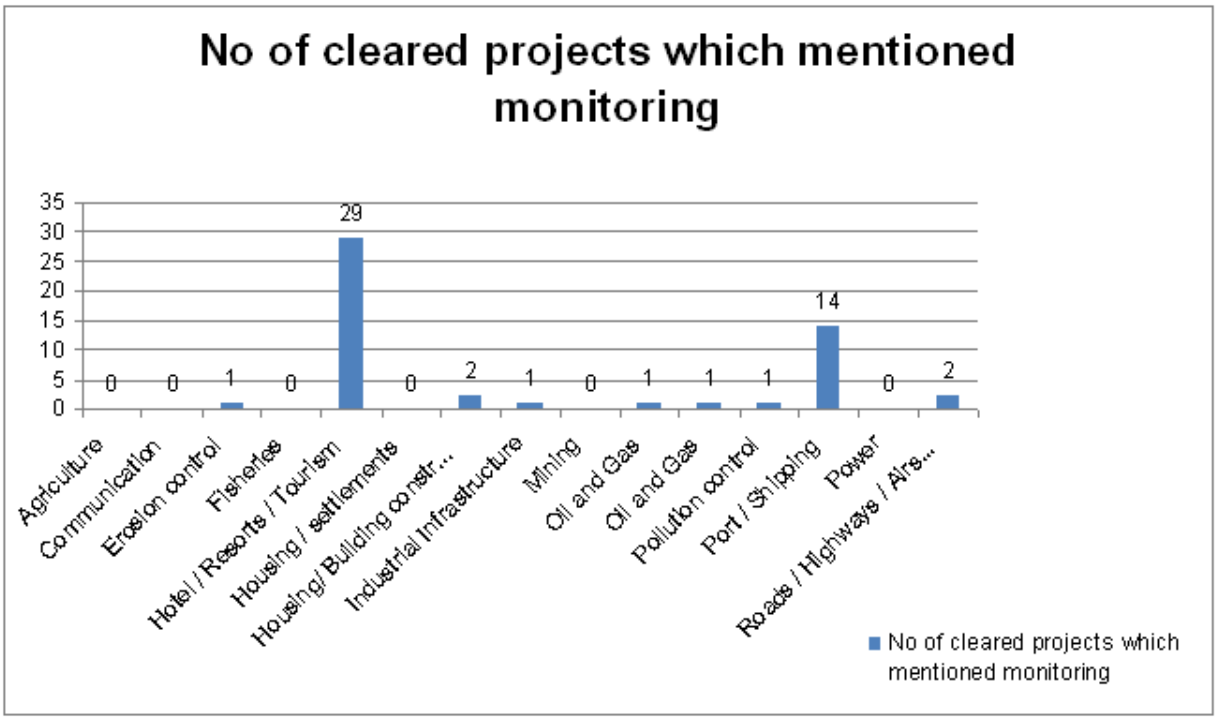
	1999	2000	2001	2002	2003	2004	2005
Cleared	10	27	21	13	29	22	49
Pending	8	9	6	1	1	0	0
Rejected	9	3	1	7	1	0	0



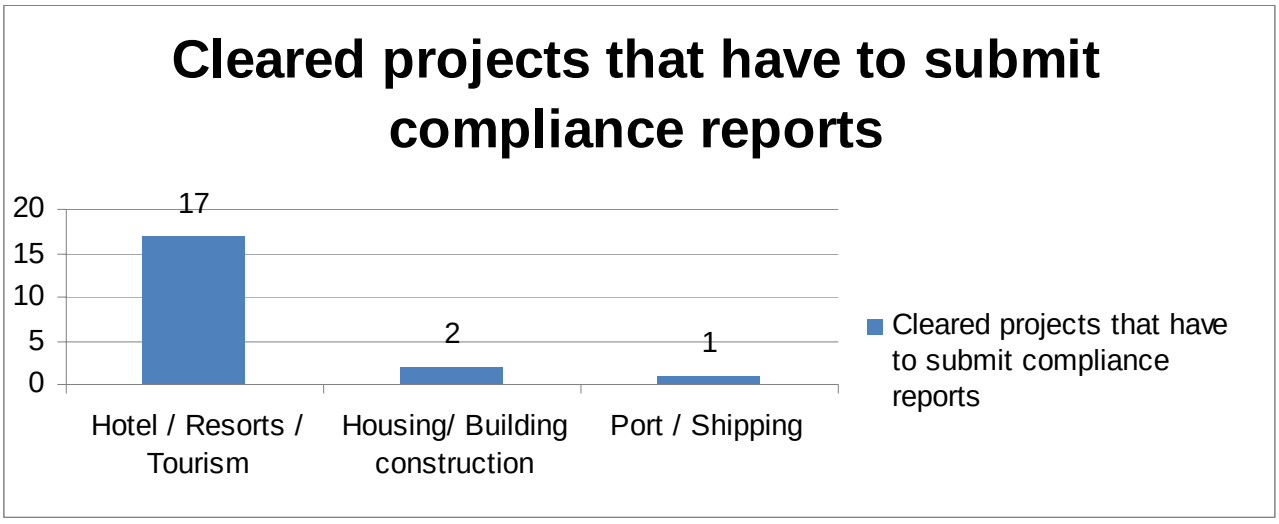
Graph 3 showing number of projects cleared with general conditions (common to all projects within a category)

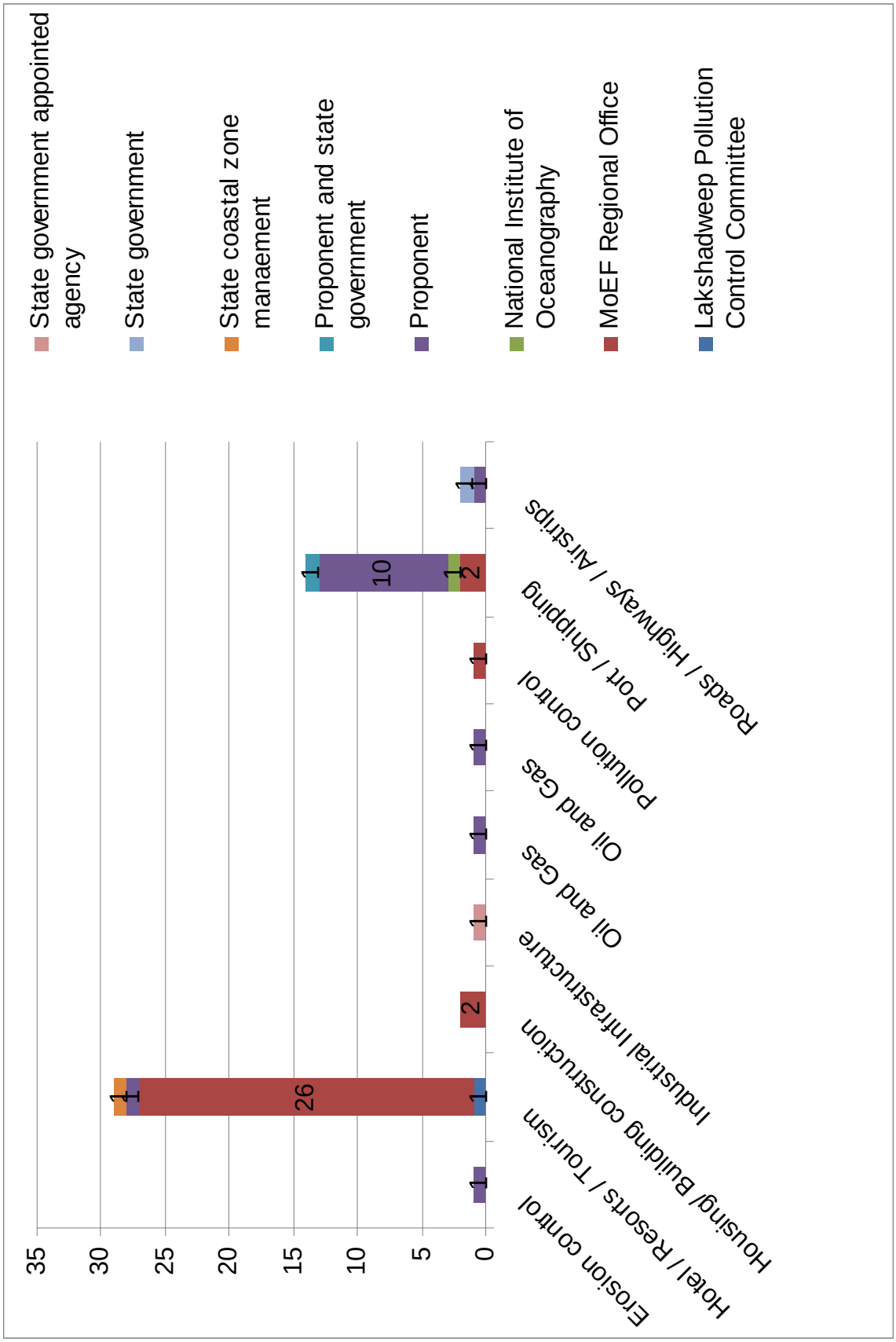


Graph 4 showing number of cleared projects which required monitoring related conditions



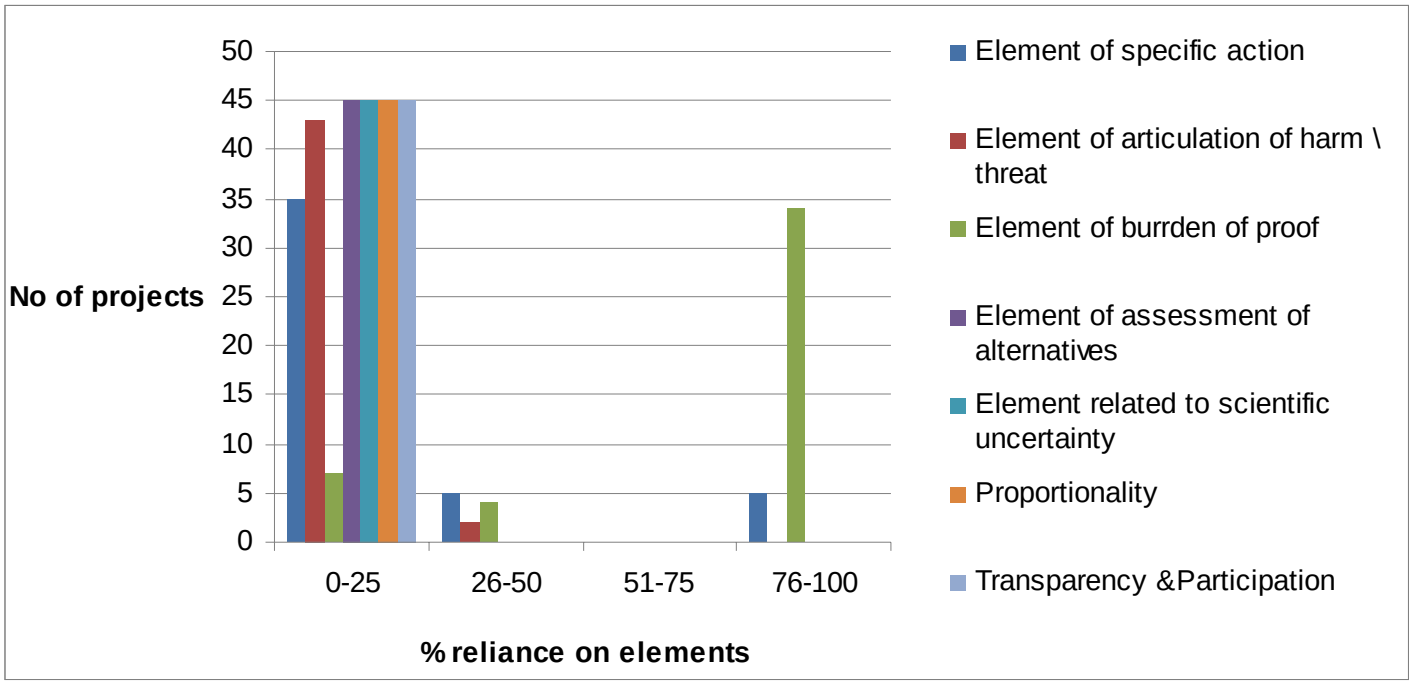
Graph 5 showing number of projects that were required to submit compliance reports



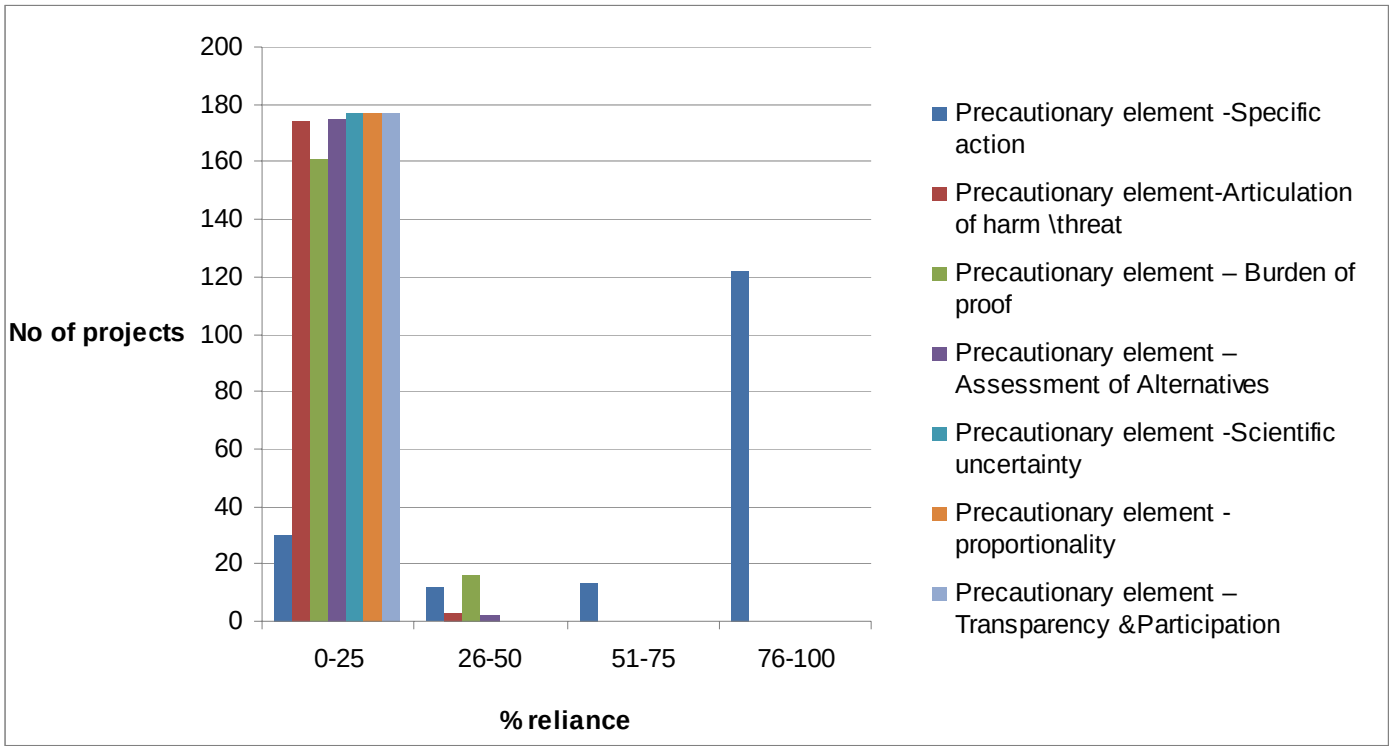


Graph 6 showing the agencies responsible for monitoring of CRZ cleared projects between 1999-2005

Graph 7 showing the extent of reliance on various precautionary elements by the MoEF in their final decision on according a 'pending clearance' or 'rejected' status to projects (shown in percentage terms)



Graph 8 showing the extent of reliance on various precautionary elements by the MoEF in their final decision on according a 'cleared' status to projects (shown in percentage terms)



An assessment of the clearance conditions under the CRZ Notification, 1991

The clearance of projects proposed on the coast within the CRZ area requires clearance from the MoEF in a number of cases.This study incorporated an assessment of the clearance letters examined from the years 1999 till 2005.

A total of 220 projects were examined. A number of basic analyses were generated from the data contained in the letters. The data revealed the number of projects belonging to various categories of projects. In addition to the self explanatory tables presented, the conditions laid out in each letter (for pending, rejected and cleared projects) was examined and categorised into various elements of precaution such as those requiring specific action, conditions containing an articulation of harm or threat, conditions that imposed a burden of proof, conditions that required an assessment of alternatives, conditions that elaborated on scientific uncertainty, conditions that was related to the idea of proportionality and finally those conditions that was related to the element of transparency and participation.

Table 3 showing % of reliance on various elements for decision and conditions in cleared projects

Precautionary element	0-25 %	26-50 %	51-75 %	76-100 %
Specific action	30	12	13	122
Articulation of harm \threat	174	3	0	0
Burden of proof	161	16	0	0
Assessment of Alternatives	175	2	0	0
Scientific uncertainty	177	0	0	0
Proportionality	177	0	0	0
Transparency &Participation	177	0	0	0

Table 4 showing % of reliance on various elements for decision and conditions in pending and rejected projects

Precautionary element	0-25 %	26-50 %	51-75 %	76-100 %
Specific action	35	5	0	5
Articulation of harm \threat	43	2	0	0
Burden of proof	7	4	0	34
Assessment of Alternatives	45	0	0	0
Scientific uncertainty	45	0	0	0
Proportionality	45	0	0	0
Transparency & Participation	45	0	0	0

In order to carry out a more comprehensive analysis of the precautionary element in these conditions, it is necessary to obtain other supporting documents. However it is seen that there is greater reliance in the idea of burden of proof on specific actions however minor these are. It has to be noted however that the letters of clearance do not explicate the reasons for these conditions which would enrich an analysis of the use of this principle in decision making.
The data in the clearance letters do not allow an for assesment of the actual value of the precautionary element present in a condition. This becomes a severe drawback in this framework of assessing decisions only through proceedural provisions and the analysing content.

An assessment of elements of precaution in the Water Act, 1974

Specific precautionary actions

- The introduction of this law itself can be construed as an action of precaution since it attempts to deal with 'the prevention' of pollution of water bodies.
- The Act also sets up boards which are empowered to take actions and interpret the various clauses of the Act which substantially place the onus of decision-making in situations of uncertainty or data deficits on these authorities.
- The Act is replete with language that is subjective and empowers the PCBs with many subjective powers to take actions where they think 'it is likely' that some harm to water sources has occurred or is imminent.

Articulation of the possibility of harm/ threats

- Standards for pollution levels and water quality are laid out in the Water Act. However, it is not clear what the basis for these standards are. Neither have these standards ever been revised in any instance.
- A number of clauses state that further articulation of harm can be decided by the authorities mentioned in the Act from time to time.

Burden of proof / responsibility for precaution and safety

- The Water Act requires a proponent of an activity to submit an application to receive the Consent for Establishment (CFE) and later a Consent to Operate (CTO). In order to obtain these, the proponent needs to provide the Board certain information (as laid out in Form XIII of the Water Rules, 1975).
- The information as provided under Form XIII, includes information on the list of chemicals and raw material to be used, the amount of water to be used, the quality of effluent and effluent reports (on a daily basis).
- Details on the nature of effluent treatment plants, quality and quantity of solid wastes and methods of disposal for the above is requested prior to providing the Consent For Establishment and the Consent to Operate.

Assessments of alternatives

- There is no mention about alternative sites within the Forms for Consent For Establishment under the Water Act.
- State governments are empowered under the Act to make or modify the formats for obtaining information related to a proposed activity. However this power has not been exercised to modify the CFE and CTO forms radically to incorporate precautionary actions or scientific uncertainties thus far.
- While many discretionary powers are provided to the PCBs, the element of using science to aid in arriving at precautionary decisions is absent in the articulation.

Addressing scientific uncertainty

- The law itself does not mention how to go about taking certain actions in the face of uncertainties or the exact process whereby the regulators can take action in the event of possible harm.
- Assuming a high degree of uncertainty exists across landscapes and regions, the Act permits the various Boards to set their own standards for water quality.
- The subjectiveness of many clauses empowering PCBs to take action suggests that the Act does not place great emphasis on 100% certainty before prohibiting substances or actions.

Proportionality (process for assessing the costs and benefits from precaution)

- There is no process outlined in the law to assess proportionality. The only place where it can be interpreted that the Act contains an element for assessing costs and benefits from precaution, is that the proponent needs to renew his consent to operate and would have to apply afresh in cases where the discharge of effluents increases or the nature of effluents changes.

Transparency and participation (as facilitating precaution)

- There are some instances where the Act empowers the Board to constitute local committees either for monitoring or to discharge its general duties. Responses from the 4 PCBs questioned about this is provided in the coming pages.

- The Form XIII requires the proponent to share what monitoring arrangements are made on his/her behalf for monitoring purposes. No emphasis is laid on public participation even at this stage

Implementation of precautionary clauses of the Water Act

In order to empirically investigate the actual application of the elements of precaution that are available within the text of the Act as shown above, a number of Right to Information applications were filed with 4 State Pollution Control Boards (Orissa, Tamil Nadu, Karnataka and Kerala) asking a range of questions on the Water Act's clauses. Responses were received from the central offices of the State Pollution Control Boards and from a few district level offices or regional offices of the respective PCBs in some states. I have collated the responses from these regions to arrive at an assessment of the functioning of these 'precautionary clauses' within the Act.

1. Limits of coastal offshore waters of the state under the jurisdiction of the PCB.

Information on this subject and copies of notifications or documents were requested using the RTI process to gain insights into the extent of the marine space that the state governments included in their jurisdiction. The Orissa PCB and the Tamil Nadu PCB stated that they were not empowered to declare offshore waters under their jurisdiction and no notification has been issued under Section 19(1) of the Act pertaining to this subject. The Kerala PCB stated that sea tidal waters extending upto 5 km from the shoreline in that state come under the purview of the Act, although no separate notification was declared stating this or the rationale for the same. The Karnataka PCB stated that the marine area three nautical miles from the coastline was under its jurisdiction whereas its regional office in Karwar stated that the entire state was declared as the water and air pollution control area. Once again for Karnataka no separate notification seems to have been issued explaining what area or why it has been brought under the purview of the Act.

2. Establishment of special committees or local committees to look into applications and projects related to coastal issues or their monitoring, representation of fisherfolk or departments of fisheries.

The Water Act contains provisions for setting up special committees or local committees at the discretion of the PCB for any purposes related to its objectives. This is an opportunity to exercise the precautionary element of participation and transparency and also to bring in special scientific bodies to address scientific uncertainty. Hence a number of questions were posed in the RTI application to the above-mentioned PCBs on this subject.

The Orissa PCB referred this question to the Orissa Department of Forests and Environment which stated that the only committee ever formed was the Orissa State Coastal Zone Management Authority and the District level CZMAs.

The Kerala PCB was unable to provide information on its members since its establishment. It appears to have constituted just two committees. One of these was a Local Area Environment Committee on 15.10.2004 for the Eloor-Edayar area for the purpose of monitoring \ advising on matters related to pollution and environmental issues in the said area. The other committee was constituted to study pollution due to the Mc. Dowell Distillery, Cherthala, Allapuzha. The Pattanamthitta office however reported that it constituted a committee in the case of Amity Rock Industries in Kottangal Gram Panchayat but fails to mention for what purpose.

The Tamil Nadu PCB and the Karnataka PCB stated that they never constituted any special or local committees and provided only the list of PCB mem bers since its establishment which reveals that the representative on the subject of fisheries was a representative of the Fisheries Department. There has never been a local NGO or any other community representative as a member of the PCB from the data obtained in the RTIs from these PCBs.

The regional offices of the Tamil Nadu PCB (at Nagapattinam Nagercoil,Tirunelveli and Thanjavur) responded that the District CZMAs set up under the CRZ Notification were the only local committees that have been set up. The Cuddalore regional office stated that no local committee was ever set up.

3. Evolving specific methods of disposal of sewage and trade effluents for coastal areas and for coastal offshore waters

None of the PCBs responded stating that they had evolved their own methods for the disposal of sewage or trade effluents in coastal lands and offshore waters. The Karnataka PCB instead clarified that the method of disposal and standards stipulated by the Board are as per the Environment (Protection) Rules, 1986 and that the consent conditions imposed by the Board are followed.

4. Extent of industries, activities, projects or activities located within the areas covered by the CRZ Notification, 1991 (coastal stretches).

This question was asked to ascertain whether the PCB stored information related to projects based on a landscape criteria or ecosystem criteria for the purpose of monitoring or enforcement according to overlapping laws such as the CRZ which envisage some duties for the PCBs. It is also assumed that storing information on landscape or ecosystem based pollution would enable the Board to retrieve cumulative impact or harm related information which would be critical in future precautionary decision-making.
The Orissa PCB did not appear to have information stored according to the CRZ criteria and instead sent information pertaining to Consent to Operate for entire coastal districts. The Orissa PCB referred all matters related to the CRZ to the State Department for Forests and Environment although the former has an explicit role in the implementation of the CRZ Notification as well. Similarly, the Kerala PCB referred this question of location of polluting industries within the CRZ area to the State Coastal Zone Management Authority. The Karnataka PCB referred the question to its regional office who either didn't respond or who further passed the buck to 'CRZ authorities'. The Nagapattinam regional office of the Tamil Nadu PCB stated that 14 industries were operating in the CRZ area and provided a list of the same. 17 industries are operating in the CRZ according to the Cuddalore regional office and the Tirunelveli office only mentioned the Koodankulam Nuclear Power Plant as being located in the CRZ. Thanjavur mentioned 2 projects located in the CRZ (a light house and a fish landing centre). However Nagapattinam did not mention its fish landing centres or harbours in its list of industries whereas Thanjavur did. There appears to be some inconsistency in what is considered an industry or an activity requiring PCB clearance according to the RTI responses.

5. Exemptions of person from the operation of Section 23(1) related to the Board and its officers' power to enter and inspect.

None of the PCBs have ever exempted any person from their power to enter and inspect premises or location. No reasons were given for the same either in personal interviews or in the RTI responses for not exempting any class of industry or persons from this clause.

6. Procedures under section 64 (2) regarding 'carrying on the business of the board or its committees and also matters related to the inquiries by the Board in the matter of granting consent to operate.'.

The rules under section 64 (2) contain provisions that permit the Boards to decide what kind of information to collect or require from a proponent before making a decision to grant consent. This includes the kinds of information required in the application form before granting clearance, and could include elements of precaution such as the assessment of alternatives or dealing with issues or monitoring, transparency or proportionality. The section empowers the state government but the rules have to be made in consultation with the Board. However, the Orissa PCB interprets this clause as not really empowering the Board to make any such rules. The Kerala, Tamil Nadu and Karnataka PCBs all state that various rules have been made by them under the section, particularly section 64(2)(b) related to the transaction of business. TNSPCB has also made rules related to the process of inquiry for giving consent under the TN Water (P&CP) Rules, 1983. However, copies were not furnished by any of the PCBs.

7. Guidelines for siting of industries in the state's coastal districts.

This question was posed to determine if any areas were declared as 'no-go areas' within coastal stretches, specifically determined by the Board (aside from other legislations). This would not only be a precautionary action, depending on the role of science in this decision but could also serve to promote the idea of alternatives. However, none of the PCBs responded to this query.

8. Number of persons/ operations/ industries/ activities operating with consent to operate, in the coastal districts as per the current date on PCB record from 2005-2010.

The Orissa PCB reported that 18 industries were operating with Consent to Operate (CTO) in Kendrapara and 24 industries were operating with CTO in Jagatsinghpur. A list of these industries was provided. While the main office of the Kerala PCB did not provide any information, the regional office at Thirssur stated that 730 industries are operating in Thrissur district with CTO as per their current record (not sure if this is the period requested, i.e 2005-2010). Only the Karwar regional office responded to an enquiry on this matter stating that 544 industries were operating with consent to operate in the coastal district of Uttara Kannada.

No complete figures were available from the Tamil Nadu PCB for the entire coastal districts, but the Nagapatinam office states that 7 industries were operating with CTO; in Nagercoil district the regional office reports that 869 industries were operating with 'Consent to Operate' where 244 industries have been issued with Consent to Operate from 2005-2010 under the Water Act and 243 have been issued the same under the Air Act. The Cuddalore regional office states that out of 18 projects or industries covered under the CRZ notification, only one unit is currently operating with a Consent to Operate – the Chemplast, Sanmar Limited (Marine Terminal Facility). It is not clear if this means that none of the other industries are operating without a CTO or whether no other industry comes under the purview of the Water Act.

9. Number of industries / operations, processes which were refused Consent for Establishment (CFE) for each of the coastal districts of the state between 2005 and 2010.

The Orissa PCB has provided no information on the number of industries which were refused CFE. The Kerala PCB stated that 11 persons were refused CFEs. Information from the Karwar regional office in Karnataka states that no one was refused a CFE. For Tamil Nadu, in both Nagapatinam and Cuddalore, no applications for CFE were refused. However, 3 applications were refused in this term as per the Nagercoil regional office.

Despite requests by RTI, no copies of the letters refusing CFE were provided to the researcher. Appeals are being filed to obtain more information on this. Judging by the high number of CTOs in comparison to the low number of CFEs refused, it appears that few industries were really turned away or that the regulators did not find any need to exercise precaution based on the information they were provided with by the proponent.

10. Number of inspections undertaken (in connection with grant of consent) for the main ports in the state and port-specific standards for water pollution levels within port areas.

There are more than 200 ports dotting the coastline of the country. Many of these are large operational ports dealing with polluting cargo. Shipping by itself is a polluting activity and there are many reasons why this sector in particular should receive the special attention of the PCB.

Karnataka has at least 10 notified ports. The Karwar regional office of the Karnataka PCB reported that only 2 inspections have been undertaken by the Board in its entire duration for Karwar and Belikere ports. Tamil Nadu has 20 ports. For the TN PCB, the Nagapatinam office reported that the Nagapattinam port was not inspected in connection with the issue of consent. The Cuddalore office stated that the Cuddalore port had not applied to the PCB for consent till date. Kerala PCB stated that for its 17 ports, only 4 reports were undertaken. Orissa offered no response to the number of inspections taken on its 13 notified ports. Kerala, Tamil Nadu and Karnataka PCBs stated that they had not evolved specific standards for water quality or pollution levels within port areas. The Karwar regional office in Karnataka stated that different limits are specified for coastal and marine discharge. This information was however not provided. The Orissa PCB provided no response.

11. Serving of notice under section 30 (to carry out certain works) of the Water Act to industries between 2000-2010.

When granting consent to a proponent, the Board can place conditions requiring such persons to undertake certain works. Should these conditions not be complied with, then section 30 of the Water Act empowers the Board to serve notices to execute such works. None of the PCBs responded that they had ever issued such a notice in ten years of their operation.

12. Receipt of information under section 31 (1) and (2) in the years 2005 and 2010 for the coastal districts of the state.

Section 31 (1) and (2) relates to the responsibility of a person operating an industry or undertaking any activity to report to the Board instances of accidental discharge of noxious effluents, poisonous or polluting matter into water. All of the PCBs stated that they had never received any such information in the last 5 years for any activities undertaken in the coastal districts.

13. Action taken by the Board under section 32 (1) (a), (b) and (c) respectively for cases related to the coastal districts between 2000 and 2010.

Section 32 (1) states that in the event of an accident whereby there has been a release of noxious effluents or poisonous and polluting material into water bodies and water sources, the Board can take corrective actions for removing such matter, for mitigating such pollution or restraining a person from exacerbating the situation. The Orissa PCB's RTI response was that it had taken action in one case in the past ten years but didn't provide any further information. None of the other PCBs stated that they had taken any action under these sections in the past ten years.

14. Issuing of directions by the Board of orders under Section 33 (1) where it has referred (water pollution) matters to a district or high court for cases related to the coastal districts.

All of the PCBs questioned reported that they had never issued directions under Section 33 (1) wherein they had requested a court to intervene and prevent a person from polluting a water source.

15. Directions from the Board to industries, operations, processes or activities or persons, (under section 33 A) for a) the closure, prohibition or regulation of any industry, operation or process; or b) the stoppage or regulation of supply of electricity, water or any other service between the years 2000 and 2010 for coastal districts.

The Orissa PCB provided a list of 28 industries which were issued directions for closure between 2009 and 2010. None of these pertain to industries on the coast. Of these most seem to be stone crushing units and brick industries. The Kerala PCB central office stated that it has issued 2 directions in this period but failed to provide any reliable figures or estimates of the same, showing either closure or stoppage of essential services for the entire ten year duration. The Thrissur office claimed also to have issued directions but without disclosing any detail. No information on this subject was forthcoming from the Karnataka PCB. The Tamil Nadu PCB stated that it has not issued any directions for either closure of the unit or for stoppage of services in the past ten years.

16. Action taken for failure to comply with directions by industries operating in the coastal districts for the period 2000-2010 and number of offences booked.

This perhaps demonstrates the seriousness with which PCBs can and are allowed to act. For the entire ten year duration, the Kerala PCB had issued closure notice only to one industry. Karnataka PCB stated that criminal cases were filed but refused further information. In Tamil Nadu, the Nagercoil office stated that such units had been issued with closure direction and direction for disconnection of power supply, whereas the Cuddalore regional office stated that all their industries were complying with the orders.

The Orissa PCB stated that one offence was booked under the Water Act in Balasore district, no offences were booked in Bhadrak, Kendrapara and Ganjam districts and 2 offences were booked in Jagatsinghpur and Puri districts. The Karwar regional office of the Karnataka PCB stated that 30 criminal and 'criminal miscellaneous' cases were filed under section 33(1) against the companies. No copies of any of the documents requested were provided halting further analyses on this subject.

Conclusion

An often repeated notion related to the precautionary principle is that it should contain both substantive and procedural elements; the substantive element suggests that, in circumstances where uncertainties and risks of irreversible harms are present, decisions should err on the side of environmental preservation; the procedural element suggests that the principle should favour decision-making processes that are iterative and informative over time and that integrate experts' assessments of the risks to be governed and people's preferences and values.

In India, the entire environmental clearance process follows a system of prior approval where a number of authorisations must be obtained before initiating an activity. Most laws also specify to some extent the nature of the information that the initiator of a project should provide. Since this is already provided in the text of the law it makes it more feasible for the initiator of any activity to shoulder this burden of proof. The text of laws such as the Water Act, 1974 and the CRZ Notification, 1991 allow ample opportunity and discretionary power for the regulator to exercise caution. However, the analysis of the procedures and the decision-making under the Water Act in particular reveals that precaution as it is understood by its various elements is simply absent from the implementation of the law.

This is not on account of a lack of a definition or on account of poor understandings of the principle. The spirit of the Water Act, 1974 is precautionary in nature and the regulators appear not to fulfil even this function. There is on the whole very little pro-active action taken towards establishing precautionary actions (either in terms of jurisdiction, or rule making or in the establishment of committees to avail of the best available scientific inputs and information. The very fact that getting even this much data on the functioning of the PCBs has taken about 7 months and that too through the Right to Information Act, shows that PCBs are still loathe to sharing information proactively and publicly such as on their websites.

The maintenance of information specific to coastal areas and stretches is also inadequate, and will have its implications for responsibilities such as setting standards based on cumulative impacts. No PCB appears to have utilised its expertise, powers or resources to have even revised or assessed the impact of its current standards.

It has been argued by scholars of the precautionary principle that since the subject matter of the principle itself deals with uncertainties, it is not always possible to find solutions in optimal outcomes, and therefore it becomes important to look for procedural rules aimed at the reduction of uncertainty (Arcuri 2006). There are several clauses within the Water Act that allow for procedures which will help reduce uncertainty, such as the powers of the state government and the Board to make rules (on enquiry before issuing consent, on the nature of application forms and information that a proponent should provide, on the nature of committees that can be constituted and their functioning) However, it cannot be claimed by any of the PCBs that they have exercised procedural norms towards making errors in favour of the environment

The minister Jairam Ramesh stated in his lecture that in cases where there are complex ecological and social issues, a consultative and transparent approach should be made while making hard decisions. The PCBs thus far seem to have taken very few hard decisions. The poor rate of refusal of CFEs and the rare cases where industries have been issued orders for closure are instances of this. The poor involvement of the public in setting standards or in monitoring them is also telling of how much more effort is necessary before these capricious seeming decisions can be termed precautionary.

Before we can attempt to call for a proper definition of the precautionary principle and greater application of the same in environmental decisions, we need to examine why the procedural provisions that exist for the application of this principle have been under-utilised. It has been suggested already by various scholars that the debate on the meaning of the precautionary principle is perhaps an endless one. Therefore, paying more attention to how regulators, proponents and citizens understand the

principle, whether the regulatory system is geared towards utilising it in a fair and consistent manner, and who is involved in the various decisions related to the principle will provide answers into how values like the PP are given importance in decision-making. This calls for a greater democratisation of not just scientific processes but also the entire governance process (recognising that the two can be mutually exclusive events).

Rather than promote a regime of 'expertocracy', the appeal of the precautionary principle should ultimately be the primacy it places on the interactive political dialogue between state regulators and the public.

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While deciding on a project, do regulators know everything about its impacts on the environment or on human health? What actions or decisions are taken when impacts of a proposed activities are unknown? The decision to act or not act, or how to act in the face of unknowns or uncertainties is the subject matter of the precautionary principle. The present study on the precautionary principle was conducted to identify gaps between this important legal principle and actual practice.